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(Continuing the Bulletin of the Association of American Medical Colleges)

JOURNAL
OF THE
Association *of* American Medical Colleges

Volume 19 MAY, 1944 Number 3

Tropical Medicine Fellowships of the John and Mary R. Markle Foundation*

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At the meeting of the Association one year ago, this Committee made a report on the teaching of tropical medicine in the medical schools of the United States.[1] It was recommended in that report that the Association sponsor and implement a program for instructors from medical schools to attend intensive courses in tropical medicine, that a Distributing Center for teaching material be established and that the John and Mary R. Markle Foundation be requested to provide financial support for this program. The Association approved these recommendations and the Committee proceeded at once to carry them out. Permission was obtained from the Surgeon General of the Army for instructors from medical schools to attend the eight weeks course in tropical medicine at the Army Medical School in Washington, and Tulane University of Louisiana consented to give a course of similar length. Each medical school in the United States and Canada was offered the opportunity of sending one member of its teaching staff to each of these courses. The Markle Foundation made an appropriation of $25,000 to the Association in order to provide travel and living expenses, and to pay the tuition at Tulane University. A supplementary appropriation of $10,000 to continue this program was made by the Markle Foundation later in the year. A full-time secretary was employed to work with the Chairman of the Committee in carrying out the details of the program.

INTRAMURAL COURSES

The first courses at the Army Medical School and Tulane University of Louisiana attended by medical school instructors began on January 4, 1943.

* Report of the Committee on the Teaching of Tropical Medicine, Association of American Medical Colleges. Read at the Annual Meeting of the Association, held in Cleveland, Ohio, October 25-27, 1943.

1. Meleney, H. E., Lapham, M. E., Soule, M. H.—Report of Committee on the Teaching of Tropical Medicine in Undergraduate Medical Schools of the United States. J. A. A. M. Coll., 18:34-56, 1943.

TABLE 1.—PARTICIPATION OF MEDICAL SCHOOLS IN PROGRAM FOR TRAINING INSTRUCTORS IN TROPICAL MEDICINE.

School	Number of Instructors Sent to Intramural Course		
	A. M. S.	Tulane	Central America
University of California	2	....	2
College of Medical Evangelists	1	1	2
University of Southern California	1	....	....
University of Colorado	1	1	2
Yale University	1	1	2
Georgetown University	1	....	1
George Washington University	....	1	1
Emory University	1	1	1
University of Georgia	1	1	2
Northwestern University	....	1	....
University of Chicago	1	....	1
University of Illinois	....	1	1
University of Indiana	1	....	....
University of Iowa	2	....	1
University of Kansas	1	....	....
University of Louisville	....	1	....
Louisiana State University	1	....	2
Boston University	1	....	2
Tufts College	1	....	....
University of Michigan	1	1	2
Wayne University	1	1	....
University of Minnesota	....	....	1
St. Louis University	1	1	....
Washington University	1	1	2
Creighton University	1	....	1
University of Nebraska	....	1	1
Albany Medical College	1	1	2
Long Island College of Medicine	....	....	1
University of Buffalo	1	1	2
Columbia University	1	1	2
Cornell University	1	1	2
New York Medical College	....	1	1
University of Rochester	1	....	2
Syracuse University	1	1	....
Duke University	1	1	2
Wake Forest University	1	1	2
University of Cincinnati	....	1	1
Ohio State University	1	....	1
University of Oklahoma	....	....	1
University of Oregon	....	1	....
Hahnemann Medical College	....	1	2
University of Pittsburgh	1	....	....
Womens Medical College	1	1	....
Medical College of South Carolina	1	....	2
University of Tennessee	1	1	2*
Meharry Medical College	1	....	**
Vanderbilt University	....	....	1
Baylor University	1	....	1
University of Texas	1	....	2
University of Virginia	1	1	1
Medical College of Virginia	....	1	1
University of Wisconsin	1	1	1
University of Alberta	1	1	2
Dalhousie University	1	....	....
Queen's University	1	....	1
University of Western Ontario	....	1	....
University of Toronto	....	1	1
University of Missouri	1	....	1
Dartmouth College	....	1	....
University of North Carolina	1	1	....
University of North Dakota	....	1	1
University of South Dakota	....	1	....
University of Utah	....	1	....
University of Saskatchewan	....	1	1
	45	39	66

* One additional instructor visited Mexico and Central America on a travel fellowship from the Commonwealth Fund.

** One instructor visited Puerto Rico on a travel fellowship from the Rockefeller Foundation.

Thirty individuals attended the Army Medical School course and twenty-nine attended the Tulane course. Subsequently, other instructors attended the courses at the Army Medical School at intervals of about two months, and Tulane University, with the consent of the Surgeon General's Office, reserved several places for medical school instructors in the two courses which it gave for medical officers of the Army. Table 1 shows the medical schools which have taken advantage of these courses, and table 2 shows the number of instructors enrolled in each course. A total of 84 instructors have had the benefit of this program to date. Of this total, 78 were men and 6 were women. Sixty-two fellows held the degree of M.D., 19 the degree of Ph.D. and 3 of Sc.D. Both clinical and preclinical instructors were included. The 60 schools represented have included 52 of the 75 four year schools and 8 of the 11 two year schools. It is gratifying that 6 of the 10 Canadian schools took advantage of the program. A few schools which have not yet been able to release instructors to take an intramural course expect to do so during 1944. These individuals will attend the course which is continuing at the Army Medical School.

TABLE 2.—ATTENDANCE OF MEDICAL SCHOOL INSTRUCTORS AT INTRAMURAL COURSES IN TROPICAL MEDICINE

	Course Beginning					
	1/4/43	3/1/43	4/24/43	7/3/43	8/28/43	Total
Army Medical School	30	6	1	6	2	45
Tulane University	29	5	5	0	0	39
Total	59	11	6	6	2	84

Both these intramural courses have been conducted with a very high degree of efficiency, and universal agreement as to their value has been expressed by those who have attended them. In the Army Medical School course some especially qualified instructors who have attended as students have also participated in the teaching. Many of the medical schools made immediate plans for the expansion and improvement of their teaching of parasitic and other tropical diseases. Some schools made arrangements for intensive reviews of these subjects by their fourth year students before the end of the academic year in March, 1943.

PRACTICAL EXPERIENCE IN TROPICAL MEDICINE

Shortly after the program for intramural courses was started, it was suggested to the Committee by Colonel (now Brigadier-General) James S. Simmons, Director of the Division of Preventive Medicine of the Army, and by Mr. Archie S. Woods of the Markle Foundation, that an opportunity should be developed for medical school instructors to obtain a short period of practical experience in the American tropics. The Medical Department of the United Fruit Company offered the facilities of its hospitals in the Central American countries, and the Health and Sanitation Division of the Office of the Coordinator of Inter-American Affairs offered the cooperation of its local field units in those countries. The Pan-American Sanitary Bureau also offered to cooperate in any possible way. In February, 1943, a group consisting of rep-

resentatives of the Army, the National Research Council, the Markle Foundation and the Association of American Medical Colleges visited Central America under the auspices of the Office of the Surgeon General of the Army to ascertain the most effective method of developing this program. As a result of this visit, a program was developed which received the approval of a conference on field experience in tropical medicine called by the Division of Medical Sciences of the National Research Council on April 21, 1943. Following this approval, the Markle Foundation appropriated $35,000 to the Association of American Medical Colleges to make it possible for each medical school in the United States and Canada to send two instructors to the American tropics for a period of one month.

The program decided on consisted of three weeks of observation at a hospital of the United Fruit Company and one week of observation with a local field unit of the Office of the Coordinator of Inter-American Affairs. In order to simplify as far as possible the arrangements for assignment and transportation,

TABLE 3.—MEDICAL SCHOOL INSTRUCTORS IN UNITED FRUIT COMPANY HOSPITALS, 1943

U. F. C. Hospitals	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Guatemala—Tiquisate	2	2	2	2	2	2	2	14
Quirigua	1	1	1	1	1	1	1	7
Honduras —Tela	2	2	2	2	2	2	2	14
Costa Rica—Quepos	2	1	2	....	....	1	....	6
Golfito	1	1	1	1	1	1	....	6
Limon	....	1	....	1	1	1	....	4
Panama —Almirante	....	....	....	....	1	2	....	3
P. Armuelles	....	....	....	....	....	1	....	1
Total	8	8	8	7	8	11	5	55

the program has been limited thus far to Central America, although it is recognized that certain other institutions and agencies in Latin America have excellent facilities for such experience. Owing to the limitation of quarters at the United Fruit Company hospitals, only one or two visitors could be accommodated at each hospital at one time. This has necessitated the use of eight hospitals in Guatemala, Honduras, Costa Rica and Panama. The field units of the Office of the Coordinator of Inter-American Affairs in Guatemala, Honduras, San Salvador and Costa Rica have been used for field observations.

The first group of eight medical school instructors went to Central America for the month of June and subsequent groups have gone at monthly intervals. Table 1 shows the schools which have taken advantage of this opportunity or who are scheduled to do so. Table 3 shows the number of individuals assigned to each hospital through the month of December, and table 4 shows the number assigned to each field unit. Assignments for 1944 have not yet been made. It will be seen from table 1 that 66 instructors from 45 medical schools in the United States and Canada are included in this program. Most of these individuals

have previously attended the intramural courses in tropical medicine at the Army Medical School or Tulane University of Louisiana, but this has not been made a prerequisite.

The program at the United Fruit Company hospitals has consisted of clinical and laboratory observation of inpatients and outpatients, participation in thick drop blood surveys for malaria on plantations, attendance at plantation clinics and observation of malaria control measures about plantation villages. The large majority of the patients are cases of malaria, particularly falciparum infections, with the occasional complication of blackwater fever. Cases of amebiasis, both dysentery and liver abscesses, are also seen. Other intestinal parasites of all kinds are common and some hospitals have cases of cutaneous leishmaniasis, typhoid fever and bacillary dysentery. A few cases of yaws and filariasis have been seen. Some instructors have made special studies of subjects in which they were particularly interested. Many of them have obtained blood smears, photographs and other teaching material.

TABLE 4.—MEDICAL SCHOOL INSTRUCTORS WITH FIELD UNITS OF THE OFFICE OF COORDINATOR OF INTER-AMERICAN AFFAIRS, 1943

Field Units	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Guatemala	3	3	6	5	6	9	4	36
Honduras	2	2	2	2	2	2	2	14
San Salvador	3	—	—	—	—	—	—	3
Costa Rica	—	3	—	—	—	6*	—	9

* One week in Costa Rica, one week in Guatemala.

The program with the field units of the Office of the Coordinator of Inter-American Affairs has consisted of visits to local hospitals in the capital cities and to the federal health departments, and observation of the activities of the field units. This has varied in the different countries. In Honduras it has consisted mainly of malaria control. In Guatemala, tours have been arranged to see cases of louse borne typhus fever, onchocerciasis and yaws. In Costa Rica, visits have been made to the leprosarium, the serpentarium and the water supply system of San José. The San Juan de Dios Hospital in San José, under the able direction of Dr. Peña Chavarría, has such a wealth of clinical material that the time spent at the United Fruit Company hospitals in Costa Rica and Panama has been reduced in order to take advantage of it. In San Salvador, the field unit was used for one month and afforded an opportunity for observation of a well developed public health program with special emphasis on malaria control.

The benefit derived from this program has depended on the clinical material available in the United Fruit Company hospitals, the diseases present in the various countries and the initiative of the visitors. Perhaps the greatest benefit has been the experience of living in a tropical country and observing the people, their environment and the conditions which give rise to a high incidence of disease. Each individual has submitted a report of his trip. Even if the chief interests of the visitor were not always satisfied, universal appreciation of the opportunity has been expressed. Suggestions for improving the program have been adopted wherever possible.

DISTRIBUTING CENTER FOR TEACHING MATERIAL

At the request of the Committee, the Army Medical School established a Distributing Center for teaching specimens in tropical medicine. The Markle Foundation made an appropriation of $1000 to this Association to meet incidental expenses. The Army supplied the personnel and the facilities for the distribution of specimens. The U. S. Public Health Service cooperated in furnishing specimens, particularly malaria blood smears. Specimens were also solicited from medical schools, universities, Army hospitals, state public health services and other sources. During the first six months of operation, 55 institutions, agencies and individuals furnished specimens for distribution. In the first nine months of operation, 37,333 specimens were distributed. The demand for these specimens has gone far beyond the medical schools to other organizations providing instruction in tropical medicine. Fifty-six Army training centers and 94 hospitals and medical and graduate schools have been supplied. The specimens have consisted of blood smears, fecal specimens, worms, arthropods, paraffin tissue blocks, cultures and infected animals. Instructions have also been distributed for the local collection and preparation of specimens. A list of illustrations from which lantern slides can be prepared has been distributed. A list of motion pictures available for borrowing or purchase is now being prepared.

RELATED ACTIVITIES

It will be remembered that the first concerted effort to improve the teaching of tropical medicine in the medical schools was the establishment of a program for experts in tropical medicine to visit medical schools for the purpose of giving lectures and demonstrations. This was organized by the Division of Medical Sciences of the National Research Council on the recommendation of Brigadier General James S. Simmons, and the approval of the subcommittee on Tropical Diseases, and was made possible by a grant from the Markle Foundation. This program was intended primarily as a stimulus to the medical schools and as a sensitization procedure for fourth year medical students, interns and faculty members. The majority of the medical schools have had the benefit of one or more lecturers from this country or Latin America. The visits of authorities from Latin America is a definite contribution to the development of closer professional relationships with our sister republics.

The Division of Preventive Medicine of the Office of the Surgeon General of the Army offered to make available to the medical schools the information which it has accumulated on the distribution of diseases and the medical and public health facilities of tropical countries. Through the cooperation of the Division of Medical Sciences of the National Research Council and aided by a grant from the Markle Foundation, this material is being prepared in book form and will be distributed to medical schools for teaching purposes. A series of fourteen maps showing the world distribution of the important tropical diseases has been prepared. Sets of these maps in notebook size, sufficient for distribution to every fourth year medical student, have been sent to the medical

schools as well as one set in wall size. It is hoped that the medical schools will use the printed material for assignment to students in studying the diseases of tropical countries.

The Army Medical Museum in Washington has recently received a grant from the Markle Foundation through the American Foundation for Tropical Medicine, to assist in the development of a collecting and distributing center for pathological specimens of tropical diseases. This will make available to medical schools gross and microscopic preparations for teaching. It has been suggested that gross specimens, accompanied by case reports, can be circulated among medical schools for clinicopathological conferences. The Army Medical Museum has already furnished such material and certain medical schools have interchanged material for this purpose.

Certain state and local health departments have become interested in the training of administrative and laboratory personnel in tropical medicine. The Army Medical School has made its course in tropical medicine available to such agencies, and certain Foundations are prepared to grant travel fellowships to public health personnel for practical experience in the tropics. The New York State Department of Health held a one day conference on malaria in June, which was attended by directors and technicians from the public health and clinical laboratories of the state. It recently held a similar conference on the pathology of tropical diseases.

ACKNOWLEDGMENTS

This program of the Association could not have been developed and conducted without the cordial cooperation of a large number of agencies and individuals, and the Committee desires to acknowledge its appreciation to those who have contributed time, effort or financial assistance to whatever success has been attained. The Markle Foundation has been most generous in supporting the program with appropriations, the total to date to this Association being $71,000. Mr. Archie S. Woods, Vice-President and Executive Director of the Foundation, has been a constant inspiration and a wise advisor. The Office of the Surgeon General of the Army, particularly through its Division of Preventive Medicine headed by Brigadier General James S. Simmons, has stimulated much of the program and facilitated its implementation. The Army Medical School, directed by Colonel George R. Callender, has graciously borne the added burden of medical school instructors in its already crowded course in tropical medicine, of which Colonel Richard P. Strong has been the Director and Lt. Col. Thomas T. Mackie the Executive Officer. The Distributing Center at the Army Medical School has been ably developed by Major George W. Hunter and that at the Army Medical Museum is being developed by its Director, Colonel James E. Ash. The course in tropical medicine at Tulane University was given by the Department of Tropical Medicine in addition to its already heavy teaching responsibilities under the direction of Professor Ernest Carroll Faust. The National Institute of Health, through the cooperation of its Director, Dr. R. E. Dyer, and the staff of its malaria research center at Columbia, South Carolina,

under Dr. Martin W. Young, has provided an enormous number of malaria slides and other specimens.

The Office of the Surgeon General of the Army, through its Board for the Investigation of Epidemic Diseases, of which Dr. Francis G. Blake of Yale University School of Medicine is Chairman, made possible the trip to Central America to investigate teaching centers. The United Fruit Company, through the Director of its Medical Department, Dr. Edward I. Salisbury, made available the facilities of its hospitals in Central America, and the agents of the Company and the superintendents and managers of the hospitals have acted as generous hosts to their visitors. The Health and Sanitation Division of the Office of the Coordinator of Inter-American Affairs under Brigadier General George C. Dunham and Colonel Albert R. Dreisbach has placed the facilities of its local field units at our disposal, and the Washington office has obtained the necessary visas for the travelers' passports. Dr. Eugene P. Campbell, Field Director of the Health and Sanitation Division for Central America, has entered enthusiastically into the program and the Chiefs of Party of the local field units, Dr. Robert L. Vought in Guatemala, Dr. Frank I. Tullis in Honduras, Dr. E. Harold Hinman in San Salvador and Drs. Thomas Phinizy and David Glusker in Costa Rica have provided interesting programs. In Guatemala, Dr. Carlos Estévez, Director General of Health, has also cooperated, and his assistant, Dr. Enrique Padilla, has conducted the tours through that country. In Costa Rica, Dr. Peña Chavarría and other members of the staff of the San Juan de Dios Hospital in San José have made available the excellent clinical and laboratory facilities of that institution.

Dr. Wilburt C. Davison, Vice Chairman of the Division of Medical Sciences of the National Research Council, has managed the traveling lecturer program, has supervised the preparation and distribution of the information and maps from the Surgeon General's Office and has been a valuable advisor to the entire program. Dr. George K. Anderson and more recently Dr. Philip J. Owen has expedited the issuance of passports and visas and has obtained the air transportation priorities. General Hugh S. Cumming and his associates in the Pan-American Sanitary Bureau have been generous in their advice on the Central American program.

Pan American Airways has cooperated heartily in furnishing directions and advice for travel to Central America, in establishing a credit account with the Association and in prompt issuance of tickets from Brownsville and New Orleans. Finally, the Committee has received the cordial and efficient cooperation of Dr. Fred C. Zapffe and Dr. A. C. Bachmeyer in issuing travel allowances and in handling the appropriations of the Markle Foundation.

This recital of the agencies and individuals who have cooperated in the program indicates not only the intricacies involved in carrying out such a national and international project, but pays tribute to the cordial relations which have existed between the many groups involved. The immediate returns from this effort in improving our ability to handle the problems of tropical medicine during the

war are sufficient to justify the program, and the long time results should be of even greater benefit in helping to place tropical medicine in its proper place in medical education in this country.

CONCLUSION AND RECOMMENDATION

It is obvious that the day of medical isolationism is past. Our medical graduates are already practicing curative and preventive medicine among our forces and adjacent populations in many distant parts of the world, not only in the tropics but in temperate zones. Others are going or will go to serve in the occupied countries during the reconstruction period. We can no longer afford to limit medical education to the diseases and health problems of our immediate vicinities. Although the fundamental principles of disease and prevention are everywhere the same, we must give our students at least a conception of the special problems which exist in other parts of the world, so that some of them may become attracted to the opportunities of participating in the solution of those problems. Just as the Health Organization of the League of Nations was the most active and useful section of that attempt at international cooperation, so will the health services offered to suffering countries and the free exchange of medical knowledge be the easiest and most welcome contribution which can be made to the maintenance of international friendship after this war.

Graduate instruction in tropical medicine in this country will undoubtedly be provided adequately by the development of specialized schools or departments in a few universities. Tulane University of Louisiana already has an active department and is negotiating with the Mexican Government for a practical experience center near Vera Cruz. Columbia University is expanding its De Lamar Institute of Public Health to include tropical medicine and already has its official connection with the University of Puerto Rico. There is probably room for at least one more graduate school of tropical medicine and hygiene in the United States and one in Canada.

Most medical schools would not be justified in giving great weight in their curricula to tropical or international medicine. But the program now in operation should be capitalized in order to retain the interest of those who have participated in it, and to maintain a broadened viewpoint among coming generations of medical students. This could be accomplished by the establishment of official connections between our universities and those of foreign countries, especially Latin America. Arrangements for the interchange of instructors and students on a basis of complete equality would acquaint them with the medical problems, research, and teaching methods of each other's countries, with mutual benefit to the solution of problems, standards of education and international relations.

Such arrangements could be developed either by individual connections, such as Cornell University already has established with the University of Havana, or by a cooperative program in which several universities in this country and abroad would participate. The growing interest of the philanthropic foundations indicates that some of them would probably support such a program, and govern-

mental agencies, both national and international, would undoubtedly encourage and help to implement it.

Since a concerted effort would accelerate and facilitate such international cooperation, it is recommended that this Association explore the possibilities and consider the advisability of taking an active part in its development.

DISCUSSION

MR. ARCHIE S. WOODS, Vice-President John and Mary R. Markle Foundation, New York City: There is not much that I can add to Dr. Meleney's presentation. It is so complete and so informative in itself that it would be futile for me to make any comments as to the details of this particular program.

The fact that has impressed me most about the development, however, has been more on the administrative side. The whole program started from nothing but an idea. A group of men shared in it. There was no precedent for the development of the program.

Dr. Meleney has given you some idea of the number of cooperating organizations and individuals, and I think you all, as administrators, will have some conception of the tremendous administrative problem involved. I would like to take this opportunity of paying a tribute to one of the very best jobs of administrative work I think I have ever seen in Dr. Meleney's handling of this particular program, and I want to take this opportunity of congratulating him. I don't think he has made a single false move. He has been very quick to notice the desirability of any change in the program, particularly in the field work program.

The work with the Army Medical School and the work with Tulane hasn't been so much of a complication because they have first class organizations already set up to work with. But the program in the field and Central America has presented many difficult problems that have been exceptionally well handled.

I would like to end with that note and congratulate, also, the Association for the fine friends that it has. It is the first time we have ever had the privilege or opportunity of doing business with the Association of American Medical Colleges, and I hope we have another opportunity.

DR. W. C. DAVISON (Duke University): I wish to emphasize Mr. Woods' statement about the splendid job which Dr. Meleney has done in handling this very complicated program. I know from the letters which I have received, that the schools have profited greatly from the instruction which members of their faculties have had at the Army and Tulane Medical Schools, and from their experience in Central America.

I move that this Association officially thank Dr. Henry E. Meleney, Mr. Archie S. Woods and the John and Mary R. Markle Foundation as well as the others mentioned (except myself) in Dr. Meleney's report for this splendid program, which will be of lasting benefit to all the member schools of the Association.

DR. O. W. H. MITCHELL (Syracuse University College of Medicine): In the State of New York we are taking advantage of this program by including it in our postgraduate work for the medical profession of the state. Through the combined efforts of the medical schools, of the State Department Health and the Medical Society of the State of New York, we are providing many speakers on tropical medicine who are available to the county medical societies and hospitals. This activity is financed by the Medical Society of the State of New York and the State Department of Health. It would be impossible for us to carry out the program if we did not have available speakers who have been trained through these courses provided by this Association and the Markle Foundation.

The Accelerated Program in Medicine*

E. M. MacEwen
President, Association of American Medical Colleges
Iowa City, Iowa

The request from your distinguished secretary that I participate in your program was accepted as a command. It was to be expected that those responsible for the production of doctors of medicine would be required to give proof that satisfactory standards were being maintained under the accelerated program. Based on these premises I will discuss very briefly the following points—What is the accelerated program? Why and how was it adopted? How has it affected the quality of the medical training program?

One of the tenets of our profession is to look with suspicion on sudden departures from accepted procedures. Medical educators are not an exception to this rule. The struggle to improve the standards of medical education has been too long and costly for us to welcome any change that might jeopardize these gains. The accelerated program, to many physicians seemed to be such a radical change. Hence, considerable unmerited criticism has been directed at it. In some instances this has come through a misunderstanding of what was being done. Some jumped to the conclusion that we were going to eliminate a year's class work from the curriculum. The accelerated program hastens an event—the graduation of doctors—but this is accomplished by utilizing a part of the long vacation period, traditional in educational circles, not through a reduction of the curriculum.

More than one year before Pearl Harbor, the Association of American Medical Colleges felt that even under the training program of the limited emergency there might be a shortage of doctors for the military services. At the meeting of this Association, held in October, 1940, a committee on Preparedness was appointed to assist military leaders in plans for the procurement of additional doctors. By May, 1941, through contacts with these leaders, this committee was convinced that a shortage of available doctors actually existed and that in case of total emergency we would be faced with a serious shortage of physicians for both civilian and military services. At their request a special meeting of the Executive Council of the Association of American Medical Colleges was held late in May, 1941, at which time the following recommendations were sent to the member colleges.

1. That all colleges that could do so without lowering medical standards, continue the training of the fourth year medical students during the summer of 1941 in order to graduate as many as possible at an earlier date.
2. That all colleges that could do so without lowering standards, admit an additional 10 per cent of students to the freshman class starting in 1941.

It was recognized that a number of schools did not have the facilities to admit

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additional students, and that very few, if any, could admit more than 10 per cent additional students without lowering standards.

The continuous clinical session during the summer months was not new, a similar program had been in operation at a few schools for a number of years with no apparent ill effect on the students.

Preparations for the general accelerated program were initiated at our annual meeting in October, 1941. On December 10, 1941, all member schools were requested to hasten plans for complete acceleration. The program was finally adopted in February, 1942, at a special session of the Association of American Medical Colleges. Supporting resolutions were adopted by the Federation of State Boards of Licensure, and by the Council on Medical Education and Hospitals of the American Medical Association.

The program was accepted with many misgivings as a war emergency measure because there was no other method by which the production of doctors could be increased without seriously lowering medical educational standards. Increased admissions were not possible; in fact, the rate at which essential teachers were being called to military duties seriously threatened our ability to maintain prewar admission levels.

The chief criticisms that have been directed against the program are:

1. That medical standards were being lowered.
2. That the war would be over before any appreciable number of doctors would be made available.
3. That the health of the medical students was endangered.
4. That the student would have no time for contemplation and digestion of new material.

MEDICAL STANDARDS:

Prior to 1940, the academic year in most medical colleges began about the first of October and ended early in June of the following year. Although about 36 weeks elapsed between the opening and closing dates, if we deduct the time lost at Christmas, Easter and other holidays, few students normally received more than 32 weeks of instruction in each calendar year. The students were on vacation 20 weeks, or more than 38 per cent of their time. Under the present program the academic year consists of three terms of 12 weeks each in class room, laboratory or on the ward. In other words, the instructional part of the academic year has been lengthened from the 32 weeks of the prewar program to 36 weeks under the present plan.

At the end of each academic year, the student will be given a vacation of four weeks. This is the maximum vacation permitted under military regulations. He then enters on his second academic year, completing the first term in the final 12 weeks of the calendar year. Thus the student completes 1⅓ academic years and has a full month's vacation in each 12 month period. By this process he is able to complete four full academic years in three calendar years with a full month's vacation during or between each academic year. In other words, the event has been hastened, not by reducing the curriculum, but by eliminating three months of vacation time each calendar year. Actually the curriculum has

been lengthened in most colleges. Under the prewar schedule the student completed his four academic courses in 128 weeks of instruction. Under the present program, 144 weeks of instruction are required to complete the medical course. This amounts to a total of 16 weeks of additional instruction—a full semester more than under the prewar program.

These 16 additional weeks make it possible to place extra stress on tropical medicine, shock, traumatic surgery, psychiatry and other subjects grouped under the general title of war medicine, without eliminating any essential subjects from the regular curriculum.

PRODUCTION OF DOCTORS:

Within the first 18 months following the adoption of the present teaching program, two classes have been graduated. More than 10,000 new physicians have been made available for civilian and military needs. The first class was graduated in the early spring of 1943, saving three or more months' time. Most of these have completed their internships and are now in or available for military services. By the end of the present year more than 16,000 new physicians will have been graduated. This is approximately 6,000 more than would have been available were it not for the war emergency program. I am inclined to believe that most of you would welcome a share of these additional graduates in civilian practice. In normal times, the number of graduates annually exceeds the losses in the profession by less than 1,800. War casualties and the increased mortality that is almost sure to occur in civilian practice because of the excessive load being carried by the older physicians will probably cancel much of this normal increase.

It is, therefore, probable that even in the event of an early peace, there will be a serious shortage of civilian doctors. The Committee on the Accelerated Program of the Association of American Medical Colleges, emphasized this point in its report at the annual meeting of that Association last October. Their findings indicated that it may be necessary to continue the accelerated program after the war because of a civilian medical emergency.[1]

STUDENT HEALTH:

Sufficient data have been advanced during the past decade by Diehl, Hetherington, Myers and others to make all medical educators aware that a real health hazard faces every student in medicine. The annual increase in the number of reactors to the tuberculin test is very alarming. Certainly, any condition tending to increase this hazard must be avoided. Since the greatest increase of reactors occurs in the clinical years, much of the fault must result from careless habits in the ward, dispensary and postmortem room, because the academic pressure is no greater than during the first two years. The present program has not materially increased academic pressure. On the other hand, much of the noncurricular pressure has been removed for most of our students, since they do not have financial worries. The few additional weeks added to each academic year should not add significantly to the health hazard. It is true that the vacation periods are shorter than in prewar days. It is begging the question to suggest that these long summer vacations were necessary for the health of the student.

Most of the students utilized the time to provide funds needed to continue their medical training. This necessity frequently forced them to accept jobs just as hazardous to their health as are the academic courses. In fact, many of them, following their sophomore year, spent the summer vacation in hospitals, sanatoria, or other eleemosynary institutions, merely a change in the location of their occupation perhaps to less protected contacts.

In many of our colleges in normal times more than one half of the student body depends on odd jobs during the academic year for board, lodging and, in some cases, a major part of their expenses. This is, perhaps, a contributing factor in the health hazards of medical education. Now only a small number of the relatively few civilian members of the classes need outside work. Since this is limited to women and class F men, neither or whom are under draft or military pressure, they could work one year, earning under present conditions much more than would be possible during normal vacations and still graduate at as early a date as would have been possible under our prewar program.

NO TIME FOR CONTEMPLATION:

Since only a minimal amount of new material has been added to the curriculum, and more than 10 per cent of time has been added to the academic year, there should be just as much time for contemplation as under our former program. Certainly, the long summer vacations spent on paving gangs or at other hard labor were not conducive to serious medical contemplation. Or does this explain why so many road workers under W. P. A. spent so much time leaning on their shovels?

Since the students need not do outside work for self support, in fact, most of them are not permitted under military regulations to accept remunerative jobs during the school year, they should have more time for the library or other productive efforts. Judging from the epidemic of marriages sweeping our medical campuses during the past year, many students have ample time for one form of contemplation.

It is regrettable that the especially gifted student is unable to interrupt his course to carry on a research project as in the past. The Selective Service Act, not the accelerated program, prevents this.

SUMMARY AND CONCLUSIONS

The accelerated program is meeting the condition for which it was adopted. It is definitely adding to the production of doctors. The financial worries of 80 per cent of the students have been solved. Their health should not be endangered more than under prewar conditions. In fact, there are reasons why it might be improved. The curriculum has not been shortened; it has been lengthened in many schools. Therefore in agreement with the statement of Johnson,[1] the conclusion must be drawn that the accelerated program "per se *need not* reduce the standards of medical education;" that if certain other conditions can be met, a modified accelerated program deserves serious consideration in the permanent postwar plans.

Note that I said *need not* reduce medical standards. This must raise the question with all of you—have the standards been maintained? Under war

conditions most standards suffer. The students are not an exception. They are restless and uncertain of their future. The recent change in the internship and resident requirements has not improved this state. No form of program could improve this situation during war times.

In a survey of the medical colleges made by Johnson[2] in 1942 he found that "23 schools reported that the losses of faculty had handicapped teaching minimally, 23 moderately and 10 considerably." If a similar survey were made today, I fear that most of the schools would report a considerable hampering because of additional staff reductions. Any further reduction in the staff will definitely affect the teaching in all schools, seriously lowering the standards in a few of them.

There is no question that the accelerated program adds to the teaching load of these reduced staffs. They are tiring under this extra burden of teaching and under the heavy load of additional clinical work caused by the shortage of civilian doctors. The recent reduction in the number of residents in teaching hospitals is certain to reduce the quality of teaching on the wards and in the outpatient services. However, I believe that we can assure you that the two classes graduated during the past 18 months will average well with the graduates of prewar days. I wish that I could be as sure of the quality of all other classes for the duration. A number of schools report a decided let down in the present upper classes.

Up to the present, all the students admitted to our schools have been selected by the faculties of the respective colleges. With the exception of the present freshman class, all the students have met the regular prewar admission standards of the particular school he entered. Many of the members of the freshman classes and at least 80 per cent of all new admissions for the duration will present only the reduced emergency premedical training. After January 1, 1945, they will have had only the concentrated military premedical courses. Many of these courses will be taken in very large classes, with minimal personal instruction and under very difficult study conditions. What effect this regimented program will have on the quality of our future classes only time will tell. The fact that most of these students will not have a choice of schools, and that the schools will not have a direct voice in the selection of their students, may materially change the type of the student body. Whether this change will be for better or worse remains to be seen. The doctrine expressed at the beginning of this paper makes us skeptical. On the other hand, some excellent young men, who normally, because of financial difficulties, would not go beyond high school, may now have the opportunity for a professional training.

Despite all these handicaps the faculties of our approved medical colleges will continue to demand quality work from all their students. That a uniform is not a protection against academic failure has been amply demonstrated during the past year. The Association of American Medical Colleges will, as it has for many decades, insist on the maintenance of adequate medical standards by all member colleges.

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Some Aspects of Medical Education in Industrial Health Conservation*

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INTRODUCTION

Every practicing physician is an industrial physician. Such a statement made today will attract little attention, but at your forty-fourth or thirty-fourth annual meeting there might have been protests. This change in attitude prompted about 10,000 physicians over the country in a recent survey to classify themselves as industrial physicians, although by no means are there 10,000 physicians serving industry on plant premises. Membership in the American Association of Industrial Physicians and Surgeons approximates 1,400, which more closely represents the actual number, although this figure is low. Of all types of medical cases requiring the services of physicians, approximately 9 per cent may be shown to be associated directly or indirectly with work as the cause or the accelerator. Medical services required by patients with such conditions are so broadly spread as to reach all practicing physicians in every branch of medicine.

Industrial medicine, long regarded as a somewhat unfavored field, rapidly is finding a place in the pinnacles of medicine. In these readjustments to a more favorable appraisal of industrial medical values, industrial medicine itself has not undergone any reformation. Instead the reformation has taken place in other groups.

At this time, much of medicine is threatened with the imposition of revolutionary changes. Inevitably some changes will occur, even though undesirable, but the tempo may prove to be slower than that now demanded by some nonmedical factions. Under legislative plans, and other schemes that have not reached the legislative state, well known to you and not to be discussed here, industry, which now employs workers representing through their families about 80,000,000 persons, may be saddled with a large portion of the total cost of medical services. Without in anywise endorsing any proposed revolutionary innovations for medical care, it seems necessary that we recognize as obvious that industrial medicine, already occupying a prominent part in medicine, may be called on to exercise a much wider function in the medical world. With or without major transformations in the general practice of medicine, industrial medicine will profit enormously if medical colleges in their plans may be influenced by an increasing awareness of the needs for improved qualifications for those physicians who participate in the highly complex, highly numerous, highly varied and constantly changing health problems of industry.

COMPONENT GROUPS OF INDUSTRIAL MEDICINE

For training purposes, the professional personnel that renders services to industry may not be reduced to one group, but several. In this comment, the

* Read at the Fifty-fourth Annual Meeting of the Association of American Medical Colleges held in Cleveland, Ohio, October 25-27, 1948.

valuable medical service rendered industry by industrial nurses is not considered beyond the statement that some 33 per cent of industrial workers are attended by full time nurses.

Apart from this group, there are five others that contribute to the total of medical care in industry. These are (1) industrial surgeons, (2) general practitioners and specialists, (3) medical directors, (4) plant physicians and (5) industrial hygienists. It is, of course, recognized that safety engineering and compensation departments and insurance divisions participate in the situations related to the health of workers.

Before making comment about the five mentioned groups, it is observed that some of these, although functioning under the umbrella of "industrial medicine," may be as remote to one another as the aurist and the gynecologist, which two specialties have only that kinship reflected by the term "surgery." Thus, the industrial hygienist may be recognized as having less in common with the industrial surgeon than he has with the plant engineering department.

Industrial Surgeons

A fairly large group of surgeons over the country with a clientele drawn from industry designates itself as industrial surgeons, and such work is recognized as a specialty by the American Medical Association. Although a few members of this group are directly associated with industry, the majority maintain private offices, perform surgery unrelated to industry, know little or nothing about industry's procedures, contribute nothing to the preventive program. It may be doubted that there are any substantial differences in the surgical requirements for a patient with a broken leg incurred in the act of walking down industrial stairs to pick up a pipe wrench, in contrast to another patient whose broken leg was incurred in the act of walking down his home cellar stairs to pick up a bottle of beer. The chief difference possibly may be found in the types of forms that are filled out and in the source of the fee paid, which in the case of industrial accidents is certain and in the other less certain. While there may be excellent reasons for setting traumatic surgery apart from other forms of surgery, warrant for labeling industrial traumatic surgery as a particular branch of medicine is doubtful. At least, there seems to be no good reason for calling on medical colleges for any special training in this field. When medical colleges have furnished training leading to "good" traumatic surgery, they have fulfilled their obligation to industrial surgery.

General Practitioners and Specialists

At all times the bulk of industrial medical work is carried out by physicians not directly associated with industry. The percentage is possibly as high as 85. Only 15 per cent of workers are in plants furnished with full time services of one or more physicians, and 90 per cent of industrial operations in this country are of such small size (8 or fewer in 90 per cent of 2,800,000) that full time medical services will never be in order. However capable in the field of medicine general practitioners and specialists may be, their unfamiliarity with industry

itself, its machines and work materials, eventuates in distressing injustices both against industry as the chief victim, but less frequently against workers themselves. From the viewpoint of industry, medical colleges fail dismally in educating medical trainees in the etiologic possibilities and limitations relative to occupational diseases. While traumatic injuries dominate industry's contribution to pathology, the significance of the smaller number of occupational diseases is far out of proportion to an equal number of such traumatic injuries. Using the state of Ohio as an example, it may be pointed out that in one year, 1942, 897,012 days were lost by workers on account of occupational diseases—no small portion of the total days lost for both accidents and occupational diseases, which for Ohio alone was 9,611,484.

It is granted that the number of work materials, machines and practices of industry that may lead to occupational diseases is stupendous, and that new ones are being added daily to the end that no physician in or out of industry may be posted fully. No less, it is pointed out that the utter abandon with which diagnoses are sometimes made by otherwise highly skilled physicians is distressing and detrimental. The key to the situation is the lack of familiarity with industry itself and the apparent unwillingness on the part of physicians to carry out those procedures necessary to avoid the ridiculous conclusions ofttimes reached. As a result, compensation courts are continually cluttered with spurious claims made by indignant, but illy-advised, workers, abetted by well meaning physicians committed to absurd diagnoses. Contrariwise, some workers are denied just benefits of compensation provision because these same physicians failed to recognize in their patients the telltale markings of genuine trade diseases.

A few examples are here introduced. In one instance a diagnosis of lead poisoning was made in a railroad worker suffering from a nondescript lot of gastrointestinal involvement, neuritis, arthritis, etc. Quite properly, this patient provided his physician the history statement that his job was that of a "white leader," but this patient was never exposed to white lead or any other form of lead. In the peculiar lingo of railroad workers, a white leader is a worker who boards up obsolete rolling stock, such as locomotives, against the depredation of small boys of the community and vandals. In another instance, a diagnosis of chromium dermatitis was made by a dermatologist in a chromium worker, but this dermatologist overlooked the fact that this worker was handling only trivalent chromium compounds which are innocuous, irritating properties being limited to the hexavalent compounds. Both these cases involved thousands of dollars in unnecessary litigation, solely caused by the physician. In one plant, a disturbing epidemic of a bizarre dermatitis was charged by the physician to the action of a waxy material employed in waterproofing military materials prior to shipment overseas. Actually, the epidemic was unrelated to work, being caused by the distribution of a large number of harvest mites brought in on the clothing of one worker living on a nearby farm and participating in the farm's threshing operations. On the other side of the picture are many occurrences such as the one in which a worker's condition was diagnosed as multiple sclerosis,

made, together with a highly unfavorable prognosis, when, in fact, the worker was suffering from the somewhat similar manganese poisoning, exposure to which substance might have been disclosed in any adequate history.

All of these events are related to the physician's unfamiliarity with industry, failure to evaluate medical and work history statements, and, in the majority of instances, the amazing inclination of some physicians to see in industry only evil and to believe that unfailingly most uncertain diseases, somehow or other, must be related to work. Actual facts are otherwise. For most industries the "family jewels" are the plant workers, hale and hearty and on the job. The extremes to which most industries have gone to provide complaint proof work conditions largely have been denied the acclaim deserved.

For years, trade unions stimulated enthusiasm among their members through continuous promises of increased wages. Now that so-called ceilings curtail this form of appeal, some unions are seeing tremendous opportunities in the health field. Manifestly, constructive achievements may derive if such enterprises live up to the dictum of one of the trade unions' health consultants, Dr. E. R. Hayhurst of Ohio, who somewhat cryptically notes: "The essential question before us today is not that of seeing that justice is done with the facts at hand, but of establishing the facts, all the facts, and, for that matter, nothing but the facts."

The greatest single obligation to this field that medical schools now have is not to turn out large numbers of expertly skilled industrial toxicologists or industrial physicians, but instead to equip the rank and file of oncoming physicians with better capacities for the application of this dictum.

Medical Directors

The aristocracy in industrial medicine is represented by a relatively small number of physicians, usually in large corporations, who function as medical directors. These men, commonly, are administrative officers, and frequently few or large numbers of other physicians serve as plant physicians under them. The larger the corporation, the more likely the director is to be removed from actual medical case problems. These physicians are chiefly concerned with budgets, policies, personnel, management relations with the medical department, etc. In this country it has not developed that those physicians, highly trained in educational institutions for competency in this field, frequently have been chosen as medical directors. More often, fellowship in the American College of Surgeons, established capacity as hospital superintendents or other administrative functions has led to such appointments. In view of the relatively small number comprising this group, the opinion is expressed that medical colleges at this time have no duty to qualify physicians for these posts.

Plant Physicians

This term, as here used, may be ambiguous. More often than not, the plant physician may be the medical director, the industrial hygienist and the industrial surgeon. The size of the plant usually determines the scope of activities of the physician. In larger corporations, several physicians in one plant or in varied

plants may serve under the medical director. As here characterized, the plant physician is that physician actually caring for cases, making physical examinations, supervising industrial nurses, performing the endless services necessary in maintaining a healthy work force. This physician is the backbone of industrial medicine. His work is far from being just the practice of medicine with an office in industry. His pronouncement on first seeing a patient usually determines the status as to compensation or no compensation, work origin or nonwork origin, litigation or no litigation. Given even average ability as a physician, this man's or this woman's value is largely determined by familiarity with every industrial operation in that plant. Working under a good medical director or a senior at any given plant, almost any well trained physician through plant medical education may, in time, become an industrial physician. Otherwise, without previous experience or training, a physician undertaking industrial work may introduce havoc in labor relations, compensation, and in relations with the medical profession throughout the community. Since this group of physicians, and usually working in the absence of a superior medical director, provides the common type of industrial physician, it may be recognized that previous training in industry and industrial medical requirements at medical colleges or anywhere else is most desirable.

Industrial Hygienists

In my opinion, industrial hygiene constitutes the outstanding scientific and scientifically romantic opportunity in industrial medicine. Industrial hygiene was created by physicians, but largely has been preempted by engineers. There has grown up an illy demarked situation with some surprising overlapping. On occasion, an engineering industrial hygienist may be found interpreting X-ray films, making diagnoses of occupational diseases, and, very rarely, indeed, performing autopsies on those dead of occupational diseases. Equally strange, a medical industrial hygienist may be found engaged in devising ventilating systems, making dust counts and other activities in the engineering field. Some extremists among engineers, in their eagerness to control this field, have mildly sought legislation requiring a license for the performance of industrial hygiene activities and making an engineering degree a requisite to such a license. Such enactment, which probably never will come about, would limit the medical industrial hygienist to cases of occupational diseases rather than to their prevention. This might mean, in my own case, that I might be forbidden by law to carry out certain procedures in this field which I myself created.

It is no less true that industrial hygiene may not be taught as a thing apart from engineering. This situation tends to place chief responsibility for industrial hygiene training in medical schools in preventive medicine departments where already engineering, in the form of sanitary engineering, is an integral part. In any event, basic training in the laboratory years of the medical curriculum is essential to clinical training in later years as subsequently discussed.

These are the five personnel groups on which the country must lean in the meeting of industrial medical problems.

A MINIMUM PROGRAM OF MEDICAL COLLEGE TRAINING IN INDUSTRIAL MEDICINE

No recommendation will be made that all medical colleges should qualify its every graduate as a highly skilled industrial physician. It will not be asserted that every medical college should undertake to turn out even a few graduates so skilled. These statements do not handicap this further one that every graduate of every medical school should be somewhat better trained in the problems of industrial medicine than he is at present. To meet on a practical basis the situation with regard to training, a five point proposal is now made guardedly. Prior to segregation into these categories, a common factor is introduced, and this by iteration. A knowledge of industry itself, and particularly industry's materials, constitutes the essence of successful industrial medicine. Too often medical colleges have detailed the training in industrial medicine to pharmacologists, physiologists, toxicologists, sanitary engineers, highly skilled in their special provinces, but with regard to industry scarcely knowing the difference between a trichlorethylene degreaser and a turret lathe. This sort of training procedure will fail and should fail. Possibly a better approach may be found in the following:

1. *Postgraduate Training.*—Some four or five medical centers, in proper geographical areas over the country, should assume the responsibility for the training of the expertly skilled industrial medical workers, the industrial toxicologists, the industrial hygienists, the physicians handling occupational diseases as a specialty, possibly the medical administrators. Past experience has not shown that the demand for such equipped personnel is great, but the actual need is great.

2. *Graduate Training.*—If all intern services carried out programs under the control of medical colleges, the definite claim would be made that that period affords the best opportunity for the implantation of clinical industrial medical training, including limited industrial medical internships. Since such is not the case, it becomes necessary to regard the third and fourth years of medicine as representing the best opportunities for such training. A fair amount of confusion has grown up around the idea that in teaching hospitals there should be a separate division of occupational diseases or industrial medicine. The practical care and management of all occupational diseases by any such unit is out of the question. On one day, awaiting services there may be one patient with a mental disorder from carbon bisulphide, one case of pulmonary asbestosis, possibly a bladder tumor due to some aniline derivative, one case of noise deafness, a possible case of blindness from industrially used wood alcohol, half a dozen cases of occupational dermatitis, etc. Obviously, these cases belong in the several clinics or departments indicated. Instead, the objectives desired may be reached by the holder of a roving professorship, with or without assistants, who may serve as an adjunct to all clinics and all divisions, since industrial medical problems reach into all clinics and all departments. The foremost function connected with his services will be in relation to etiology. He should be as familiar with industry as he is with his own thumb, or as a physiologist with his own labora-

tory. There are such physicians, and their attainments should prove acceptable to all. Wisely chosen, he should become the heart of industrial medical instruction.

3. *Didactic Teaching in the Clinical Years.*—This same roving professor or his assistants, for the purpose of creating adequate background for his clinical contributions, should be given opportunity to meet with all students, preferably in the junior year, for some such group of lectures and demonstrations as are represented by 12 or 16 hours—this for the purpose of introducing background and system paving the way for subsequent isolated contributions on a day by day basis in divers clinics.

4. *Industrial Hygiene in Laboratory Years.*—The framework of future successful training in occupational disease work, and to some extent industrial medicine in general, is to be found in a knowledge of industrial hygiene—the public health aspect of industrial medicine. Such training is a necessary antecedent to the successful work of the roving professor just discussed. Medical students should be made at least familiar with the nature and method of action and portals of entry of the more troublesome gases, vapors, metals, dusts, irritants, rays, vibrations, etc. At the lowest level of such instruction, there should be provided a working knowledge of threshold limits, laboratory determinations, the fundamentals of prevention, etc. While separate courses in this field might be worthwhile, the practical utilization of time available prompts only the recommendation that one-fifth of the time devoted to public health and preventive medicine during the first two years of training be devoted to industrial hygiene, and, logically, through adequately trained personnel in the department of preventive medicine.

5. *Research.*—Industrial medicine is woefully lacking in precise knowledge of almost all of its highly numerous diseases, which number is augmented year by year. Apart from specific diseases, there are general situations such as fatigue, about which we know relatively little. Without exception, every department in the medical school, from physiology to psychiatry, might well make its contribution to this engaging field. Many investigations have already been made, but industry itself, through its medical departments, has provided more. It is to be hoped that the research facilities of medical colleges to an even greater extent may be directed to some of the enigmas of industrial toxicology.

Industrial medicine lives in no ivory tower from which ex cathedra pronouncements may be made as to the best form of industrial medical instruction. Speaking in humbler fashion, industrial medicine would have you believe that there is a genuine need for the better preparation of all physicians in this branch of medicine.

Correlations of Physiology Instruction with War Problems

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Thirty-five years of continuous teaching have taught me that a lecturer who expects his audience to remain conscious must not overload his discourse with gratuitous information or matters which can be acquired more fruitfully in other ways. So, may I state at once that this is not another oration on "how to teach." Nor do I tend to weary you with a lengthy dissertation describing the many war problems which could be considered in physiology during wartime. I shall, rather, content myself with an exposition of a few general educational principles which we have found expedient in the teaching of medical physiology and which are easily applied to wartime problems. I gravely doubt whether our plan of execution can easily be transplanted, as a whole, to other institutions in which schedules and circumstances are somewhat different. What and how much can be attempted depends, of course, on the staffs that can be retained. If I can merely interest some of you sufficiently to consider the application of certain principles in your own ways, the purpose of my discourse shall have been accomplished.

Education, like medical research, is an experimental project. Since results depend partly on the experimental material, it is pertinent to describe it briefly. The number of students employed in my educational experiments numbered about 2,800. They were not anesthetized. All worked under considerable initial tension. They were conditioned for acquisition of medical knowledge to different extents. Their premedical training ranged from graduation from a high school to completion of a college course. The latter groups were unquestionably more mature, showed greater decorum, displayed better judgment and, of course, possessed a larger stock of scientific and cultural knowledge. But, as regards the qualities of attentiveness, alertness, interest and zeal and with respect to their capacity to organize work efficiently, to reason and to think clearly, I have failed to detect significant differences. I mention this not as an argument for setting the clock of medical education back to 1907, but rather to indicate why I do not share the fear of many medical educators that those student qualities which are most fundamental to medical education will suffer materially through an inforced abridgement of their period of premedical education during the war. Of course, our instructional methods must be modified, just as experimental procedures need to be changed when different types of animals are employed.

Indeed, for the duration of the war, the degree of success achieved in maintaining present standards of medical education will rest rather on the capacity of educators to adapt their techniques to changing conditions than on the immaturity of students who come to us. May we face this responsibility squarely and patriotically. We produced fairly good doctors and even some investigators thirty-five years ago. We can do so again.

In conducting an experiment in education, as in science, its purpose must never be forgotten. Students enter our medical schools in order to obtain a general medical education, not to become specialists in medical sciences. Consequently, while not unwilling to increase their fund of scientific knowledge, they are more eager to digest, absorb and assimilate the kind of information which they consider of practical importance. This is a natural human trait; more information is mastered with the same expenditure of energy and additional energy is cheerfully expended on projects which are of interest. Physiology is coming to assume an increasingly important position with relation to the practice of medicine. The progressive doctor is no longer content to describe signs and symptoms, to group them and, in the light of past experience or autopsy checks, to give the disease a name. Rather, the tendency exists to regard disease as a physiological experiment which nature makes on man or animals, and the urge exists not merely to recognize but *to see through* the functional derangements exhibited by its signs and symptoms. It is, therefore, encumbent on physiologists so to organize their courses that this important integration of physiology and medical practice is fostered and not stifled. Such natural interest should rather be stimulated (1) by deliberate analysis of problems with a practical bearing, (2) by inclusion of laboratory exercises which reduplicate phases of experiments which nature makes on patients and (3) by demonstrating the similarities between results of disease and experiments through analysis of patients in physiology clinics.

During national emergencies, new problems involving physiological knowledge confront the medical man both at home and at the front. Medical education must, therefore, be modified so that the emerging young doctor understands not merely the experiments which nature makes on man but also those that man inflicts on himself in warfare. However, no great difficulty—except time—exists in including a consideration of such problems in courses which already include applied clinical physiology. The time exception, however, is all important. Expediency decides that additional time can usually not be allotted in an already crowded and accelerated program. Substitution and change of emphasis remain the only alternatives.

For us the choice seemed clear. In the first place, we temporarily abandoned that part of our program which exemplified physiology in patients. We did this reluctantly for the clinics in physiology arranged by the departments of medicine, surgery and pediatrics were so organized that they integrated with our didactic and laboratory work and thus aroused a keener interest in physiology. This we did in order to relieve the load of the greatly depleted medical and nursing staffs in the University Hospitals.[1] In the second place, some additional time was released by cautious elimination of subject material considered in other departments and which, therefore, represents duplicated instruction. Physiology has been the mother of so many sciences, now fullgrown and competent, that material once considered as a part of physiology may now be entrusted to their care. Such shifts have been in progress for some time. The trend is shown in

1. We believe it possible to resume such integrative physiology clinics during the next session.

the changing contents of physiology texts during the last four decades. Formerly, much space was given to elementary physical and chemical discussion and to anatomical and histological details; gradually these vanished, and latterly a reduction in biochemical material has become noticeable. Only by such processes has space in books and time in curricula been made for the consideration of the increasing volumes of biophysical and medical material. For us, some time was gained by reducing consideration of problems of nutrition and diet, for these highly important subjects receive rather unusual emphasis in our courses in biochemistry.

Caution must be exercised in making such deletions. Changing trends of the world may even make it necessary to restore considerations once considered needless. For example, I have long contended that too much space in textbooks and too much time in classes have, in the past, been devoted to an intimate study of special senses. Most of our students have repeatedly been exposed to the physical principles of optics in courses of physics and to the functional aspects of vision and hearing in experimental psychology. At any event, they review them again in subsequent courses of ophthalmology and otology. New methods of warfare, however, have created so many new problems relating to vision and hearing that more extended consideration would again seem to be indicated. However, such re-inclusion should stress new biophysical discoveries and practical aspects rather than the shopworn and nostalgic experiments which have had little value, except to fill a course with the least amount of effort.

Emphasis on the application of physiology to disease and to problems created by the war does not require the sacrifice of considerations of general or biophysical principles on which an analysis of function is based. Personally, I favor the plan of giving dominant emphasis to biophysical principles, during the introductory period of a course, and continue to regard the classical approach to the subject—muscle-nerve physiology—as the most satisfactory means to this end. A study of these tissues allows consideration of a maximal number of fundamental processes and biophysical methods within the shortest space of time; it serves admirably to train students progressively in technical methods of graphic registration, and, at the same time, it affords an acquaintance with the chief functions of muscles. The number of physiological facts that a medical student must know with respect to muscle is not large. The substance of essential knowledge can be summarized in one sentence. He must know that muscles are excitable, that they respond to stimuli, either by a twitch or tetanically, as in voluntary contraction, that the speed of reaction varies widely in different types of muscles, that muscles perform work and can fatigue. But the biophysical processes which are concerned in these phenomena are innumerable. For this reason, chiefly, muscle and nerve represent the most thoroughly studied tissues of the body. Consequently, it seems logical to utilize them for the same purposes in the classroom. Among the mechanisms considered are sources, gradients and transformations of energy, oxidation, combustion, membrane and ionic phenomena, liberation of heat, electricity, etc.

However, even during such an incipient period of drill in the principles of

general physiology and biophysics, the interest of a student can be enhanced by occasional consideration of practical aspects that may exist. For example, one of our earliest laboratory experiments deals with the improvement in contraction which results from moderate stretching of muscle. Here the opportunity arises for pointing out that this is the fundamental process by which the myocardium adapts its contraction to the volume of returning blood, and by which it compensates for valvular defects.

By progressively increasing the complexity of frog muscle experiments, sufficient technique is soon gained so that a few practical experiments on man can be introduced. In this way, students can easily demonstrate on themselves, by means of an ergograph and a pressure cuff applied to an arm, the importance of blood supply for the maintenance of muscle contraction. They also experience the disagreeable sensations and pain associated with such occlusion. In addition to conference considerations of the fundamental reasons for such effects, attention is called to the similarity of events in coronary occlusion. Indeed, the information, still not generally appreciated, is imparted that a totally ischemic area of myocardium ceases to contract in 30 seconds and never recovers after 30 minutes.

An experiment on a bicycle ergometer not merely serves to emphasize the ultimate mechanisms responsible for fatigue, the changes in oxygen consumption, metabolic rate, muscular efficiency, oxygen debt, etc., but also evokes discussions as to why much less effort may induce similar reactions in such apparently unrelated conditions as starvation, diabetes, anemia, infections, adrenal insufficiency, heart disease, respiratory disorders, etc. These findings are reviewed again later in the course in discussions of muscular exercise, physical training, physical fitness, etc., but the student early appreciates the fallacy of endeavoring to discover means for creating energy for fatigued men by administration of pep pills, vitamins or hormones. They realize that the only method for increasing physical efficiency or endurance consists in training the body so that more of the total energy is expended as mechanical effort.

Enough has, perhaps, been said so that the reader conversant with physiology instruction can appreciate our plan and purpose during the introductory period.

Having obtained a grounding in a body of fundamental mechanisms, we proceed to consider the functions of various systems, accompanying the didactic work with suitable and related laboratory experiments. At this stage—and for the greater part of the remaining time—the principles which guide instruction are reversed. Primary emphasis centers on understanding of the normal functions and, secondarily, on fundamental biophysical aspects. At this time, also, a plan must be evolved for correlation of physiology with medical and military problems. Several methods have been tried at various times: (1) Correlations of normal and applied physiology at the time when the normal functions of individual systems are first considered. (2) Completion of a survey of normal physiology followed by a period restricted to applied physiology, and (3) combination of the two.

Each procedure has advantages and shortcomings. In favor of the first is

the fact that applications of physiology are continually kept before the student. The chief drawback is the fact that alterations of functions are rarely limited to the one system under consideration and more usually involve others, the functions of which have not yet been considered. The second procedure overcomes this handicap and permits consideration of interrelated systemic disturbances. It also offers opportunity for a review of the normal physiology and emphasizes the interdependence of all body functions. Since a combination of the two methods retains the advantages of both and fits rather better into the blocks of time provided in our schedules, we have utilized this plan for the past few years. I shall resist the temptation to detail all the clinical and military correlations which are considered, except to mention that the war projects include such topics as handicaps of the vestibular mechanisms in flying, fatigue of the eye and ear, principles of camouflage, dark adaptation, spatial judgments, blood transfusions and blood substitutes, artificial respiration, pulmonary edema, concussion and contusion of the brain, etc.

The course in physiology concludes with a consideration of selected projects which stress the application of physiology to military problems.

The effects of moderate and severe exercise of short and long durations are not only of fundamental importance in military training but present an opportunity for reviewing the functional responses in many organs. In severe exercise, practically every compensatory reaction of the body is brought into play. The state of physical fitness which results from regulated military training is probably due largely to the fact that these reactions are repeatedly invoked and become better coordinated. If one or several fail, fatigue or staleness may be expected.

The effects of environmental influences, such as heat and thirst in deserts, of high temperature and humidity in jungles, of solar radiation and cold at high altitudes, etc., are all discussed from practical as well as physiological angles. The projects related to aviation are accompanied by group demonstrations on the effects of passive changes in posture and of anoxia on the respiratory, circulatory, reflex and cerebral functions. Each group of students performs standard tests of bodily and circulatory efficiency. The Barany' chair test, formerly introduced chiefly to demonstrate the phenomena of nystagmus and past pointing, has been adapted to analyze experiences and sensations resulting from acceleration effects of flying, etc. Since the major research activities of the department during the past three years have been devoted to a study of shock and hemorrhage, these problems are naturally considered with thoroughness. Disorders of the heart and circulation and of the gastrointestinal tract which seem to be developed as a result of the strain of warfare are considered from physiological angles as far as our present knowledge permits.

This narrative should suffice to indicate that practical military problems are not overlooked. Much more could be done of course, but we have considered it inadvisable to do so at the expense of applied clinical physiology. Assuming that our present students will enter military services, it is probable that the majority will need the sort of training they have always received more than they will

specialized knowledge. If assigned to specialized fields, our military services, of course, provide suitable training. For example, one of my former instructors, who participated in our teaching program in anoxia for 2½ years, having expressed a preference for aviation, is now starting the regular course in aviation physiology at Randolph Field. Consequently, the best educational excuse for introducing any reference to military problems in physiology courses is, that it is a good expedient by which to stimulate the interest of students.

Many of the topics are, of course, of tremendous importance for doctors at all times. For example, consideration of various disturbances of sensation, such as paresthesias, tingling, itching and, of course, somatic and visceral pains, including headache, are of primary importance in every form of practice. Such disagreeable annunciations of dysfunction remains the most effective stimulus which impels patients to consult physicians and surgeons. For many years, little physiological advance was made in the elucidation of pain because investigators have always been careful not to inflict pain on animals deliberately. Consequently, no experimental approach to the problem existed. With the significant advances in methods for studying the activity of separate nerve fibers and the discovery that pain can be signalled in unconscious animals, the physiological mechanisms of pain have become fairly well understood. The interesting experiments which nature makes on man through disturbances of endocrine functions certainly require careful consideration. Little elaboration is required as to the importance of other problems.

The research interests of a departmental director naturally affect the distribution of stress on various aspects of physiology. This is really of importance to students for, regardless of the subject chosen for special consideration, it is part of an education in physiology to appreciate that much more information exists on every subject than can be considered in a cursory course. Our emphasis on heart and circulation is not entirely conditioned by my own interest in these subjects but can be justified by the fact that death from cardiac disease still ranks at the top in mortuary tables.

I consider it a duty of physiology laboratories to train students in physiological techniques used in the practice of medicine and in the interpretation of data derived therefrom. On the part of the cardiovascular system, the measurement of human blood pressure and registration of electrocardiograms by simple machines assume paramount importance. The interpretation of changes in systolic, diastolic and pulse pressures and the simpler aspects of electrocardiographic interpretation should be part of every course. In our program, the latter are taken up at various periods of the course being grouped around interpretations of common cardiac arrhythmias, changes due to hypertrophy and those following coronary occlusion. The optical recording of central as well as peripheral arterial pulses has probably been carried out by students themselves, only in our school. The important information which can be derived from such studies has been appreciated generally in Europe, South America and even in China and Java, but is still almost completely ignored in this country. The recording of heart sounds and murmurs, which it was my privilege to introduce into this

country, has made rapid strides, and can now be accomplished almost as easily as the recording of an electrocardiogram. It ought to be made use of more generally in teaching. Here, rather than in practice, lies its chief value. I shall resist the temptation to make further comments on the many other aspects of physiology which are considered from the viewpoints of functions, ultimate mechanisms and practicability. But without doing so, my listeners, if still in a state of awareness, must have raised several questions for themselves: (1) Is it advisable that modern physiology should arrogate unto itself the teaching of all of medicine? (2) Is the tremendous coverage of subjects outlined perhaps so superficial that, while the scheme has a brilliant hue on paper, students are actually in possession of little information at the end of the course? (3) Are the students driven to the point of exhaustion in mastering even a part of this great volume of material? I shall answer these questions squarely and I hope fairly.

1. It is advisable that modern physiology assert its earned position as the foundation of modern medicine, exemplified by the patient while still alive. This doctrine so ably enunciated by Magendie, by Claude Bernard and Meltzer should reverberate through the classroom and laboratory of our schools and the teaching wards of our hospitals. However, while the whole field of medicine involves physiology, it would be foolish to claim that physiology covers all of medicine. The province of physiology in relation to disease is not always fairly appraised. On the basis of experimentation, correlated with critical reading, the physiologist learns that certain alterations of functions are expressed by rather definite and, occasionally, by differential reactions. There is no better illustration than electrocardiography. Nature executes experiments which may give similar reactions; but, too often, a number of experiments operate at the same time. As a result, the reactions, called signs and symptoms, do not always signal the character of functional disturbances clearly. It is the province of the physiologist to suggest to what these reactions may be due. It remains for the clinician, on the basis of experience and wider correlations with many other sciences, to decide whether an interpretation based on simple laboratory experiments also apply to nature's more involved ones. From such a viewpoint, we feel justified in our didactic emphasis, particularly since the subject of physiology has been retained as a second year subject, where in my estimate it belongs.

2. I could, if required, probably obtain testimonials from members of thirty-five past classes that consideration of subject material in my courses has never been superficial or sloppy. We, as a staff, feel satisfied, on the basis of weekly conferences, occasional tests and a final examination, that students have acquired a usable fund of knowledge. This is supported by records of state board examinations in which no single one of our students has, to my knowledge, actually headed the list; but, as a group they rank near the top. I recall once addressing a note to Dean Sollmann, somewhat after the following manner:

"My dear Dean: I note that, while our students again hold favorable rank in state board examination reports, none of our students ever seem to head the list. What is the reason for this? 1. Do our students not know the full or correct

answers? 2. Do the examiners not know the answers? 3. Do we give our students sufficient experience to gain proficiency in the gentle art of cheating?"

To this our facetious dean replied: "(1) I believe they know the answers. (2) The examiners may know answers but, perhaps, not the correct ones. (3) I have heard rumors about cribbing."

Returning to our theme, the scheme presented is not merely outlined on paper, it is actually carried out. The alternative conclusion that this can only be accomplished by strenuous work on the part of students and staff alike is correct. None of my students, whether those of thirty-five years ago or of last year's class will have forgotten that I am an advocate of the strenuous life, and I venture to assume that a majority, in retrospect, will have appreciated having had the privilege of learning to work intensively in their course of physiology. Indeed, it is my experience that the great majority of our students work cheerfully to the limit of their capacity, provided the work proves interesting, and, provided also, the staff shares cooperatively in the hard work. When an instructor tells me the students are not interested in the work and are disinclined to fall into step, I draw the conclusion that his efforts, rather than those of the students, are most likely at fault. However, if only to assure my misinformed colleagues, we do not drive students to the point of exhaustion. Witness the experimental evidence: At the termination of the course they can still walk to pathology; they do not need to be carried there.

The desire to work with maximum effort is rarely inborn; it is learned in the school of life through hard work and discipline. Such discipline may be imposed from without, as in the Prussian system of compulsion, or it may be initiated from within, after the American way, by creating the urge to regiment oneself. As environment favors development of spontaneous rhythms in cells, so training acts as an environmental influence which develops the internal urge for repetitive effort. Perhaps, the most significant contribution that any course can make toward the development of future physicians is to give students an opportunity to demonstrate on and for themselves that intensive effort is not merely harmless but one of the most satisfying experiences in life, as long as the urge comes from within.

It is conceivable that, owing to drastic reductions of staffs, many of us may be required to curtail consideration of projects which now seem essential to the practice of medicine and the war effort. But should only a skeleton course remain, we shall still be playing an honorable part in the war effort if we continue to inspire students to aim for a full and strenuous life, and show them the way to achieve this with the greatest economy of effort.

An Experiment in Medical Care

Outgrowth of a Teaching Exercise in Clinical Medicine*

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Medical educators have always maintained that the use of hospital wards for the teaching of medical students improves the quality of medical care received by the patient, and tends to raise the medical standards of the hospital. It is my purpose to show how a teaching program in clinical medicine, which included a consideration of the patient and all of his relationships after discharge from the hospital, stimulated an experiment which we believe points a way in which standards in this phase of medical care can be raised.

My story is probably best told by recounting a series of experiences we have had at Syracuse over a period of thirteen years. For several years previous to that time, we had been convinced that medical education was becoming too institutionalized and had sought for some means of integrating into the undergraduate course some program which would give students a broad point of view as to what was involved in satisfactory medical care,—which would get them to think in terms of the patient as an individual suffering from disease rather than merely in terms of disease as an entity. We were not convinced that the newly introduced courses in psychobiology or conferences with social workers were in themselves providing a satisfactory solution of the problem.

In an effort to integrate a consideration of the patient and the various social and other influences to which he was subjected, with the disease from which he was suffering, there was initiated a program which involved placing responsibility on each student for a complete study of at least one patient who had been assigned to him as a clinical clerk on the medical wards of the University Hospital.[1] The general plan of the program was that the student would make a study of the family and social background of the patient, and of his home, living and working conditions, in an effort to determine what in the life of the patient led to his illness. He was to determine whether the home conditions were proper for convalescence, and whether the home, living and working conditions were proper for the patient following convalescence. Finally, he was asked to outline a program for the patient following his discharge from the hospital.

At the beginning, the home visits connected with the program were made under the general supervision of the hospital social worker. However, it was

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* Address delivered at the Annual Dinner for the Committee on Health Activities of The Commonwealth Fund December 17, 1943. A detailed report of this experiment was recently published by The Commonwealth Fund as a book entitled "Medical Care of the Discharged Hospital Patient."

1. Bailey, A. A. and Weiskotten, H. G.: The Training of the Student in What Is Involved in Adequate Medical Care. J. A. M. A. 109: 2136-2137 (Dec. 25), 1937.

our experience that this supervision tended to routinize the work of the student and failed to develop initiative and the co-ordination that was essential to a satisfactory point of view toward the case as a whole.

After several years of experimenting, the following program was adopted: Each third year student, during his clinical clerkship on the medical wards, is assigned a patient for investigation. The patient selected is one whom he has studied from the clinical point of view. An effort is made to select cases which present individual and environmental problems. The selection is made by a member of the medical staff who is on active duty on the medical wards. He may be aided by the social worker in the selection of cases but the student does not consult the social worker before making his study of the case.

The staff member discusses with the student the significance of the investigations and outlines a general plan of procedure. The student then visits the home, interviews the family, surveys the situation in general and drafts a rough report, giving the results of his investigation. The staff member reviews this report with the student and then accompanies him to the home and familiarizes himself with the situation. He discusses with the student the problems presented and may make suggestions for further investigation. The student prepares a report which includes a series of recommendations with regard to the adequate handling of all aspects of the case. He presents this report at one of the medical seminars which are held weekly throughout the year. The seminar is conducted by the staff member in charge of the students' investigations and, in addition to four to six students, is attended by the professor of public health, the professor of psychiatry, the chief social worker in the County Welfare Department and the social workers from the hospital and the outpatient department.

We have found that a discussion of the case by the social workers means more to the student at the time of the seminar than it would if held before he had completed his own investigation. Each faculty member discusses the situation from his own particular point of view and questions the student in regard to various aspects of the case. The attending students participate in the discussion. The student is expected to continue to follow his patient and later to file a supplementary report.

In connection with this program the student is frequently brought into contact with various public and private health, welfare and social agencies and learns how they are prepared to co-operate with the physician in the care of the patient. He comes to realize the importance of a proper patient-physician relationship as well as to appreciate the influence of emotional and environmental factors on the welfare of his patient.

We believe that as a result of these experiences our students graduate with a better appreciation of the many problems involved in the practice of medicine. They are also better prepared to assume intelligent leadership in connection with modern social trends as related to satisfactory medical care.

Soon after this teaching program was initiated, it became obvious to all participating in it that the medical care of most of these ward patients after discharge from the hospital was entirely unsatisfactory. The students themselves became critical of existing conditions and frequently could offer little hope of providing satisfactory medical care for their patients, although their study on the hospital wards might have indicated clearly the need for such care. The vast majority of the patients were medically needy and on discharge from the hospital were referred to the outpatient clinic or became the responsibility of the city physicians if they became ill at home.

It appeared that many factors contributed to the unsatisfactory progress of these patients after their discharge from the hospital. Carelessness or failure on the part of the patient or his family to understand the true nature of his disease and the importance of following a prescribed program, together with adverse social and economic factors and particularly lack of medical supervision tended to nullify the benefits of hospitalization. Many patients were repeatedly readmitted to the hospital because of cardiac decompensation that could have been prevented, diabetic coma that should not have occurred, and a host of other conditions which satisfactory medical supervision would have prevented.

As our program of case studies proceeded, we became more and more convinced that the situation needed further consideration. Dr. Albert A. Bailey, who had supervised the work of the students, pointed out the need for medical supervision of patients after discharge from the hospital wards. He undertook, as a preliminary study, to follow each patient from the medical wards of the University Hospital for a period of one year after discharge. He also endeavored to provide medical care at home to those patients who, because of the severity of their illness, seemed unable to attend clinics at the Syracuse Free Dispensary. Although this preliminary study was undertaken on a part time basis and with very limited facilities, it brought to light certain interesting facts:[2]

Approximately 90 per cent of the cost of hospitalization on the medical wards of the hospital was due to chronic illnesses. The benefits provided by hospital care appeared to be only temporary in most cases of chronic disease unless adequate medical supervision was continued after discharge. Only about one-third of the patients received what was considered satisfactory medical supervision after their discharge from the hospital. The duration of many patients' stay in the hospital could be shortened and much rehospitalization prevented if intelligent medical supervision was provided after their discharge.

The approach to the problem seemed obvious. Some program should be developed whereby the hospital staff could assume more responsibility for ward patients after discharge and for medical aftercare at home for those patients unable to attend clinics in the outpatient department. It was thought that such

2. Bailey, A. A. and Weiskotten, H. G.: The Problem of the Discharged Hospital Patient. Hospitals, 13:13-17 (Aug.) 1939.

medical supervision might be provided by a qualified physician who would be added to the house staff of the hospital to serve in the capacity of an extramural resident on the medical service. He would be familiar with the progress of the patient in the hospital and with the details of a sound program for medical supervision after his discharge.

The Josiah Macy, Jr., Foundation, which had contributed to the support of the teaching program and to the preliminary study, offered to support an experiment based on the proposed extramural resident program. This program was initiated July 1, 1940, and involved all patients discharged from the medical wards of the University Hospital.

It is probably important to mention, very briefly, the general medical facilities available in the City of Syracuse before discussing the experiment itself. Syracuse is an industrial city with a population of 205,000. It has five general hospitals with a total bed capacity of about 950. There is a City Communicable Disease Hospital with 84 beds and a State Psychopathic Hospital with 60 beds. In connection with the County Home is a hospital for the chronically sick with 180 beds. This latter institution is classified by the State Department of Social Welfare as an Infirmary. There is also a County Tuberculosis Sanatorium with 255 beds. It is estimated that there are some 60 "nursing homes" in the city.

The Syracuse Free Dispensary, an independent agency, closely affiliated with the College of Medicine and the City Department of Health, serves as an outpatient department to the general hospitals but is geographically separated from them. There is no city or county general hospital and the medically needy are admitted to the ward services of the five general hospitals.

The Department of Public Welfare provides the services of ten part time district physicians for the domiciliary medical care of the indigent and uses the Visiting Nurses Association for bedside nursing.

At the outset of the experiment conferences were held with representatives of the local medical societies and of the various official and nonofficial agencies interested in the fields of medical care. At these conferences, plans for the program were discussed and the co-operation of all concerned was assured.

Dr. Frode Jensen, a recent graduate in medicine who had completed an internship and a residency in medicine and had spent one year in pathology, was appointed extramural resident. He was also appointed as an instructor in medicine and became a member of the house staff of the hospital. He was given an office in the hospital and provided with the services of a full time secretary. The various community agencies offered to make their facilities available to him. The hospital social service department was to assist in the provision of social service but it soon became evident that the volume of work was far too heavy a burden for this understaffed department. This led to the appointment of a social investigator who devoted her entire time to the extramural resident program.

On the extramural resident was placed the responsibility for the general supervision of all patients discharged from the medical wards. He was to act as family physician to those who had none and would need medical care at home after discharge from the hospital. He would also undertake to follow, through their physicians, those patients who, except during hospitalization, had their own private physicians. Those patients who did not have a private physician but who were able to attend the Syracuse Free Dispensary were to be discharged with instructions to do so and arrangements were made to follow their records at regular intervals. Patients discharged to other institutions were similarly followed.

Thus the program involved the supervision of four groups of patients: (1) the home care group; (2) the dispensary group; (3) the private physicians' group; and (4) the institutions' group. However, these groups were in no way static as patients were frequently transferred from one group to another.

The extramural resident, as an instructor in medicine, enjoyed the same hospital privileges as an attending ward physician; he made daily rounds and participated in weekly "grand rounds." In addition to making daily morning rounds, he further familiarized himself with the problems of the patients by holding daily bedside consultations during which plans for after care were discussed. Participants in these discussions were the resident in medicine, the extramural resident, the hospital social worker, the social investigator appointed for the experiment, and a representative of the Department of Public Welfare. These conferences also aided the extramural resident in establishing a proper patient-physician relationship which was essential to the satisfactory conduct of the experiment.

It was realized from the beginning that only by integrating the various elements of medical care could a plan be worked out for the after care of the patient. It was also evident from the first that the immediate problems of patients with acute diseases were chiefly of a medical nature. For the most part, social and economic difficulties related to their illnesses were temporary and no long range plan of medical care seemed indicated. On the other hand, the patients with chronic disease presented medical, social and economic problems which were so interwoven that each element at times seemed of primary importance and any plan for their future care had to be envisaged over a long period of time.

The study included 902 patients who occupied beds on the medical wards between July 1, 1940, and February 1, 1942. Except for a few adolescents, all were adults and were medically needy, although some were able to pay part of their hospital expenses. The patients were referred to the hospital by the Syracuse Free Dispensary, the city physicians, private physicians or by the police as emergency cases. The incidence of diseases was not unusual and corroborated the findings of our preliminary study; 758, or 84 per cent, of the patients were suffering from chronic illnesses.

During the period of the experiment, 165 patients required home care by the

extramural resident following their discharge. Experience soon led the extramural to investigate the home environment whenever he contemplated treatment of a patient at home. When care at home seemed out of the question, medical care was undertaken in a few of the nursing homes of the city. However, none of these nursing homes was found to be satisfactory.

It immediately became obvious that many patients who had previously been treated in the hospital over periods of weeks or months could be discharged much earlier to the extramural resident's service. Early discharge from the hospital at first worried certain of the patients, but when the program was explained to them, they not only willingly accepted it but showed evidence of having found a new sense of security.

Needed co-operation of the public or private relief agencies was secured before the care of the patient in the home was undertaken. At the beginning of the experiment it was anticipated that there would be a great need for nursing help and that the Visiting Nurses Association might have difficulty in meeting the demands made on it. However, this did not prove to be the case. There was usually some one in the household who could be taught to assume responsibility for ordinary nursing procedures. Although Visiting Nurses were used in only 19 cases, it was obvious that no domiciliary medical care program could be entirely successful without the availability of skilled nursing service. Visiting Housekeeper Service was provided in eleven cases and without such service the care of these patients in their homes would have been impossible.

The laboratory facilities of the hospital and the Dispensary were available to the extramural resident and 575 laboratory tests were carried out on patients while under home care. Many diagnostic, as well as therapeutic, measures involving minor surgical procedures, ordinarily carried out in the hospital, were performed in patients' homes.

The home care group offered an unusual opportunity for carrying out medical care programs based on the study of the patients during their hospital stay as well as on the various emotional, social and economic factors which might have a bearing on their illnesses. With these patients under the care of the extramural resident, all of the various personnel and agencies involved, as well as the patients themselves, had the advantage of constant medical supervision. There was thus provided an opportunity to coordinate all of the various services with the medical needs of the individual patient.

Not only were these patients discharged from the hospital earlier than would have been possible if the services of the extramural resident were not available, but it is believed that much rehospitalization was saved. One hundred and fifty-one (151) of the 165 patients in the home care group were suffering from chronic diseases which were tending to become more advanced. Hence, it would not be justifiable to compare the amount of hospitalization required previous to the initiation of the experiment with that during the conduct of it. However, what were

considered very conservative estimates indicated that for this group of 165 patients, 7,268 days of hospital care, at a cost of $29,072.00, were saved through the services of the extramural resident. This saving of hospital days was sufficient to provide for the hospitalization of 302 additional patients with average stays of 24 days during the course of the experiment.

It was obvious that when rehospitalization was required, much time was saved if the patient was admitted to the University Hospital where his complete record was available. All of the 69 patients who were rehospitalized while under the care of the extramural resident were readmitted to the University Hospital. This indicates the saving of many additional hospital days. This is substantiated by the fact that twelve additional patients who had been discharged from home care to the Dispensary by the extramural resident were later admitted to other hospitals. The average stay of this latter group was 26 days as compared with 14.5 days for the group re-admitted to the University Hospital.

There seemed to be no doubt that the provision of medical care in the home by the extramural resident, who had known the patient during his hospital stay and who acted in every sense as his family physician, prolonged the benefits of the hospital stay and gave the patient a sense of security that had beneficial effects on his health.

Although the extramural resident's supervision of the Dispensary group was on the whole less intimate, the program was conducted in such a way that he was prepared to render individual service when it was indicated. As a result, home care was initiated for 51 patients in this group. Only 23 per cent of the patients referred to the Dispensary on discharge from the hospital reported there without further action by the extramural resident. As a result of such action, an additional 61 per cent came under Dispensary care.

The services of the extramural resident to the private physician's group involved mainly giving to the private physician a summary of the hospital findings and arranging for the re-establishment of proper relationships between the patient and his physician. The attitude of the private physicians toward the program is indicated by the fact that they gave monthly follow-up information requested by the extramural resident in regard to 93 per cent of the patients in this group. Always prepared to cooperate with the private physician in the care of his patient, the extramural resident was called on to assume active responsibility for the medical care of ten patients in this group.

The experiences of the extramural resident brought into bold relief the inadequacies of community facilities for the care of patients with chronic diseases. This was especially true of the County Home and Hospital and the so-called nursing or convalescent homes. The County Hospital, although modern in structure and well equipped, was found to be lacking in the recognized standards of administration and treatment. Many of the nursing homes were nothing more than board and room establishments, disappearing as rapidly as they came into

existence. They were all understaffed and, except in a few where a registered nurse or practical nurse was employed, the attendants were without qualifications. No records were kept and it was difficult to maintain daily accounts of medication or of routine pulse and temperature readings. The keeping of narcotics and medicines was a matter of serious concern; the importance of keeping the former in a clearly labelled container and in a locked cupboard was not appreciated nor was the principle that one patient's drugs must not be used for another. Special diets were very difficult to regulate and the entire atmosphere of most of these nursing homes was in no way in keeping with a satisfactory program of medical care.

The extramural resident's supervision of patients cared for in these institutions led to a local program for raising standards in both the County Hospital and the nursing homes.

We are convinced that this experiment has demonstrated a means of providing continuous medical care for patients who are economically unable to employ a family doctor.

Good medical care programs should not only center about well equipped and well staffed hospitals and clinics but should reach out to include the individual patient and all of his relationships.

Unless we are prepared to furnish a qualified physician to pilot the medically needy patient suffering from chronic disease on his course after leaving the hospital, we shall continue to waste time, effort and many thousands of dollars by hauling him back to port for repairs each time he goes on the rocks.

The Intern

He stares at Death and smiles at Life,
And shrugs off cares with nonchalance.

* * *

But when he hears the strident gong,
M. D. becomes his accolade.
To heal the sick, to right the wrong,
He rides upon his own crusade.

Incisive as a slicing knife,
He dominates his ambulance,
Conquistador of circumstance.

—Robert Calvin Whitford.

An Experiment in Reading Medical Literature

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Some of the faculty members in the Medical School have been interested in studying reading abilities of medical students. During the accelerated war program, speed of reading has become, more than ever, a problem. How fast do medical students read? Can they be made to read more rapidly? Do they really know how to read? These, and similar questions, were in the minds of these faculty members.

This fall, we constructed a test which we called "Exercises in Reading Medical Literature" and gave it to seventy-one freshmen. The first exercise was scored on the basis of the number of seconds it took to read it. Scores ranged from 40 to 140 seconds. The second exercise was scored on the basis of the number of words read in 40 seconds. The score range was from 70 to 303 words. For the 71 students the correlation between the two methods of measuring speed was $.86 \pm .02$ (Pearson Product-Moment Method). This indicates that either method of measuring speed is worth while.

Exercises III to VIII were more definitely concerned with comprehension of the content read, tested by multiple-choice and true-false items covering this content. While there were time limits, they were not unduly restrictive—i. e., each student had some opportunity to read at his own speed. Comprehension, therefore, was emphasized more than speed, whereas in Exercises I and II, there was no measure of comprehension obtained. Correlations between Exercises I, and II, and Exercises III to VIII combined, were, respectively, $.23 \pm .07$ and $.26 \pm .07$. These low correlations, substantiating one another, supply definite evidence that speed and comprehension in reading medical literature are not closely related. The medical student who reads fastest is not necessarily the one who reads with comprehension. There are evidently other factors which operate in comprehension than speed alone. Neither can one say that the slowest reader comprehends better, for the correlations were positive—not negative.

A further suggested experiment is one where there are no rigid time limits on the reading—where the test is a power test of comprehension alone. Any reluctance to experiment in reading medical literature may be relieved if the instructional values of such exercises are considered.

The lecture method has become probably too much of a fixture in medical education—in all higher education for that matter. It undoubtedly has its value but its exclusive use is not justified by any objective measurements of its values. The writer has often given expression to the thought that the lecturer is the one who probably gets most of the benefits from his lectures. While people generally seem to enjoy some lectures, there has never been enough measurement of the outcomes of lectures in medical schools, for example, to draw any valid

conclusions concerning their effects. The writer would guess from many years of contemplation and reflection, that often the outcomes from many lectures by professors to students are meager from the students' point of view. At least it is "up to the professors" to furnish valid and reliable measurements to prove the contrary. The reading-exercise method, with valuable reading material selected, supplies an alternative to the lecture method which may be tried on occasion anyway. It may prove to be an excellent method of instruction and has advantages of furnishing numerical data on student understanding and mental achievement as well. Why not give it a trial? It might prove itself so worth while that it would receive increasing emphasis in instruction.

Teaching by and through testing is a method which probably has not been stressed sufficiently. The measuring value of testing has been too exclusively emphasized. Certainly, there is inherent in the testing process a student motivation not always found in other methods of instruction.

While the lecture method—especially the lecture demonstration—is indispensable under certain circumstances, and especially in stimulating emotional attitudes, there are other methods which should be given experimental opportunity to prove themselves. The reading exercise is one. It might not even be necessary to have tests mimeographed. Textbook materials might be utilized for the purpose. Preparing tests, mimeographing, and scoring are three objections to this method of instruction. The use of the regular text; a simple method of supplying queries—even the oral method might be utilized; and a quick and easy method of scoring the queries; these might overcome the objections usually raised against too much testing with the complaints arising in preparing, mimeographing, and boring time spent in scoring.

Is it not true that an instructor's function is partly one of instructing students how they may best get desired information from the printed materials available for his courses? The reading-exercise method is recommended for this purpose.

Is Medical Education in Touch with Tomorrow?

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The present struggle for our continued existence as a nation of free men, and for the perseverance of those ideas in which repose our common hopes for the happiness of mankind, has already produced profound changes in every element of the social structure. Edifices therein generally regarded as highly conservative and fixed in their methodology, such as the banking system, prove on examination to be moved by such intense pressures that they are well accustomed in adaptation to the changing needs of the structure. The educational system, which superficially would appear to be highly adaptable to changing needs but in practice has shown itself to be extraordinarily immune to ideational pressures, has been proven (by the recent upheaval which has swept through university and college) to be subject to change when suitable pressures are brought to bear. The state of war has divorced so-called "higher education" from much of the old principle, practice and privilege which patterned the system before the war began. Accepted medical education has been characterized by a quite remarkable lack of variation in its general pattern, and in keeping with the policy of the profession, as a whole, is conservative in its reaction to ideas of change. Recent discussions of possible alternative methods of medical education show that not all consider the present general plan to be completely adequate. Now is the time, when the whole social structure is highly fluid, when the minds of people at large are tolerant of the examination of need for change, and the educational system is in a state of flux, to examine most closely into the adequacy of the various parts of that system in their likely postwar needs.

It is probable that there is no such thing as the ideal medical education, owing to the rather wide biological variation in medical students as a class. The standard medical school consists of a faculty of co-operating departments which (discounting personalities) bear a more or less classical relationship to one another. Departments are largely, often completely, autonomous as to subject matter taught to students, and, in a sense, are in competition with one another for student time. There is little attempt to integrate the various knowledges presented by different departments, and in some medical schools it is a matter of pride—or has been—that no such integration should occur. It is held that the student is personally responsible for his own integration of ideas. In place of lighting the way, only those are chosen who can see very well in the dark, and the system enjoys some success insured by considerable elimination of the unfit. Given a high grade of individual attention, and adequate time for the student to achieve his own integrations, a highly adaptable and individualized medical man, well able to take care of his own development, might be the happy result.

But it is quite obvious that such a plan of education (or lack of it) is not susceptible to quick reaction when dramatic changes undermine the importance

of departments privileged to a high place in the classical system of relationships, and increment the importance of the minor departments. One remembers the slow reluctance of the departments of anatomy to recognize their new importance in the structure of medical education. It is also obvious that such a plan of co-operation is not likely to be looking forward and arranging its relationships today so that the student is prepared for the new pattern of the medicine of tomorrow. Rather, he is likely to be fully prepared for the medicine of yesterday and today, because his teachers grew up in, and helped develop the system as it was yesterday, and is today.

Unfortunately, a triple conspiracy has thrice undermined the present validity of this form of "co-operative" medical education, in which each department undertakes to make an expert of each student in the respective subjects. First, the acceleration of the teaching program takes the younger, less mature candidate, and forces him to compress two (or three) years of premedical work into fifteen months, and four years of medical studies into three. Little or no time is left for personal integrating activities. Secondly, as classes enlarge, due to larger acceptances and closing of inadequate medical schools, instructors decrease in number (military). Thirdly, and extremely important, the complexity of medicine in all its branches steadily increases. As a result, the medical graduate of today is less well prepared to deal with the problems of today's medicine than was the graduate of three years ago.

Obviously, little can be done immediately to improve any of these conditions. We are left with the unfortunate conclusion that owing to current conditions, medical education is immediately and now inadequate. The problem is, however, will the subject pattern of today's medical education, now compressed in time, be adequate on postwar re-expansion to meet the requirements of the medicine of tomorrow?

Reduced to its simplest terms, the duties of a medical education should be, first, to equip the student with knowledge of a system of practice (diagnosis and therapeusis). There is little doubt that much of this system might be taught empirically; there is little doubt that much of it is learned empirically; and there is even less doubt that most of it will be practiced empirically. However, the second purpose of medical education is to impart as much understanding, or rationality, as is possible, to the system of diagnosis and therapeusis. Obviously, it is an important part of this second purpose to so educate the student of today that he will have rational understanding of medicine of tomorrow. It is here we may ask if medical education is today adapting at a pace which anticipates the changes which are now going forward in medical thought, and which will condition the pattern of medical practice tomorrow. The answer, measured by the ability of current graduates to rationalize recent developments in medicine, is not very assuring.

It is perfectly obvious that medicine in the last ten years has moved more and more into the realm of chemistry. This is true in clinical medicine, in bacteriology, in physiology, and, perhaps above all, in therapeutics. The whole tex-

ture of rational therapeutics has moved steadily away from empiricism ("materia medica"), replacing these remedies with mensurable chemical entities. A mere list of the compounds which have joined the armamentarium is convincing evidence of this trend. The sulphonamides, mandelic acid, thiocyanates, atabrin, plasmochin, the active sterols, the vitamins, the digitalis aglycones, the ergot alkaloids, lyophil-lyophobe detergents, thioureas, prostigmine, choline derivatives, are just some of the early invaders, forerunners of a tremendous chemical army. But how many graduates fresh from the hands of their educators handle these drugs with more basic understanding of the nature of their therapeutic weapons than did their predecessors of ten years ago their tinctures and fluid extracts and powdered bugs' wings? How, on the other hand, should we expect our recent graduates to better the Committee on Therapeutics which undertakes on behalf of the profession of therapeutics to rename the classical nicotinic acid "niacin"? In its acceptance we must rechristen this pagan child of the test tube.

The same lack of real understanding characterizes every phase of medicine on which chemistry has set its seal. And there is no phase on which it has not. How many of our recent graduates could discuss any other than the broadest aspects of the metabolism of carbohydrate in body and cell? The reason for the answer is simple,—that the modern theories and proven facts of carbohydrate metabolism read like a page from the big Cohan. Few medical men are found entitled to discuss it in any detail, and they are likely to be in or associated with departments of biochemistry. This statement could be true of a great range of normal and pathological physiology. The average medical graduate has a vague general understanding, but not real feeling based on genuine understanding for the problems involved, because they are based on chemistry, or on physical chemistry. We are, then, faced with the situation that we are graduating medical men who are not in real contact with the basic sciences which give reason to their diagnosis and therapeusis.

One notable result of this fact is that the great wave of progress in medicine has ceased to come from the clinician at the bedside, or from the pathologist in the morgue, but takes its sources rather in the test tube laboratory. Only those institutions which can afford to maintain such laboratories keep a place in the race to contribute. These are necessarily large foundations, many of them, unfortunately perhaps, commercial houses. The every day clinician at the bedside has ceased to be able to think freely in the common terms in which these advances are phrased. Unless there is some change in the quality of his education, this confusion will be even more complete ten years hence.

There are two possible solutions to the clinician's problem. The one consists in finding more places, and greater responsibility in the framework of medicine for the trained biological chemist in clinics, hospitals and teaching institutions. This would relieve the clinician from the responsibility for basic understanding. The other is to widen greatly the facility with which medical men (students) think, for today and for tomorrow, in the common parlance of biological chemistry.

This could only be achieved by some alteration in the pattern of present medical education, implying realignment in our current ideas of the "importance" of various subjects. This need not lead to prolongation of education time if authorities would examine their curricula with a view to integration and co-ordination and the elimination of much redundant material. Many of our medical disciplines are taught at levels which are quite out of keeping with their general use. What student, the day of examination, is not prepared with the fermentation characteristics of *Eberthella typhi,* or the morphologic characteristics of *Iodameba?* And what clinician but has to look them up? I recollect in the course of early years in medical school equipping the sides of a hexagonal pencil with useful prophylactic information bearing on the dentition of the six orders of primates, information which then and now I cannot imagine to have any use to the medical student, but indicating a state of mind which still persists in professional ranks in medical education.

Students should obviously not be taught, nor expected to know, encyclopediac information which is only remembered by specialists in the field, or by books of reference. They should be taught the principles and methodology of a discipline, and how to use the reference material relative to the subject. But above all, they should be prepared to keep pace with shifting trends in the philosophy of medicine. This is only possible where the structure of medical education is such that it can be sensitive to the evident direction of the fundamental sciences in the philosophy. The direction predicated by the next decade is that of the increasing influence of biological chemistry.

A Practical Course in Environmental Sanitation for Medical Students

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There is considerable difference of opinion as to what should be taught to undergraduate students of a medical school in preventive medicine and public health. There is, however, agreement that environmental sanitation must be taught. The methods and plans of teaching this particular phase of preventive medicine vary, but most teachers are still looking for a plan which will be practical, interesting and helpful to medical students.

Smillie, in his "Objectives in the Teaching of Preventive Medicine and Public Health"[1] forcefully points out three premises with which we are in complete accord. Too often teachers of preventive medicine (environmental sanitation) lose sight of the fact that they are teaching students who, in the great majority of cases, want to and will practice general medicine. Losing sight of this, they wonder why medical students are generally not particularly interested in the course.

With these thoughts in mind, we have been teaching our course on a somewhat new plan, much of it frankly experimental. The interest and enthusiasm it has aroused in our students has exceeded our expectations. The students seem to feel that they are acquiring knowledge useful to them in their future practice of clinical medicine and that we are not attempting to prepare them for a health officer's job. We have attempted to combine in our teaching the basic principles of sanitary engineering, given in a manner that appeals to the students, and the application of these principles to preventive medicine. We have not emphasized public health but have left the application of sanitary principles of preventive medicine to public health to the students themselves. The manner in which this was accomplished will be presented later.

The course as presented by us is allotted 60 hours and is divided into four segments. It is offered in the second semester of the sophomore year.

1ST SEGMENT: This covers a total of 16 one hour lectures covering in a more general way (1) water supplies, (2) waste disposal, (3) food and drug

1. J. A. A. M. Coll. 18: 281 (Sept.) 1943.

control, (4) milk inspection, (5) meat inspection, (6) mess sanitation, (7) food poisoning, (8) garbage and refuse disposal, (9) rodent control, (10) mosquito control, (11) swimming pool sanitation, and (12) industrial hygiene.

2ND SEGMENT: The following major and minor projects were planned and each student was permitted to select either one major project or two minor ones, according to his own interests. Many students selected more. A major project requires two afternoons from one to six o'clock, and a minor project requires one afternoon of a like number of hours.

Some of these projects are carried out in the buildings or on the grounds of the Medical Branch, including the John Sealy Hospital. Others are carried out in the field in Galveston County or adjoining Harris County, and still others are carried out in the City of Houston. Each project is supervised closely by a member of our staff or by some member of the U. S. Public Health Service, the Federal Bureau of Animal Industry, or by a recognized Industrial Physician. The students themselves perform the actual tests and make their own observations, a scheme made possible by keeping the groups small (not more than 12 to a group).

The projects conducted, with important major points of each, are:

MAJOR: 1. *Rodent Control.*—Classification of rats most prevalent and habits of these rats; signs of infestation and procedure in estimating rat population. Rat stoppage, rat trapping, choice of bait, fumigation, determination of flea index, formulation of plans for a typhus control program, city ordinances, and benefits to be expected from a control program.

2. *Mosquito Control.*—Classification, habits and characteristics, drainage, filling, stream training, elimination of artificial containers, oiling, larvacides, destruction of larvae by natural enemies, destruction of adults, screening, nets.

3. *Inspection of Eating Utensils in Hospitals and Cafes.*—Methods of swabbing eating utensils, using cotton swab and sterile saline solution, inspection of dishwashing methods in hospital, fraternity houses, cafes and drug stores with bacterial count of representative number of dishes.

4. *Rural Sanitation.*—Location and design of small water supplies; safety factors as applied to well and distribution system; chlorination of entire system; requirements of an approved supply.

Inspection of septic tanks and leaching trenches; performance of soil exploration test to determine water level and select depths below surface for most suitable leaching; performance of standard tests to measure permeability of soil; consideration of alternative methods of sewage disposal when soil is not suitable for leaching.

5. *Air Conditions of Public Buildings.*—Use of sling psychrometer, changes in relative humidity in a room resulting from occupancy by a small group, effect of air motion on heat loss from human body, sensation of coolness upon enter-

ing room with dry air and temperature equal to that of external temperature, principles of mechanical air conditioning, characteristics of air flow at exhaust and discharge openings, humidity control in a class room by means of rapid air changes, principles involved in mechanical ventilation of class room.

6. *Cross Connections.*—Inspection of hospital and local hotels for back-flow through flushometer valves; back siphonage from water closet; lifting of water through an open faucet through an air gap when negative pressure is created in the line or other cross connections.

7. *Industrial Hygiene.*—Demonstration of dusts (effect of particle size on settling rate, collection of air samples, and dust counting); mists, generation of mists electrolytically; irritant gases (measurement of concentration in air by absorption in a suitable medium—using chlorine, sulfur dioxide and oxides of nitrogen as examples); organic vapors (method of measuring volatility of solvent liquids under conditions simulating those of actual use in industry); fumes (demonstration of fuming properties of various metals such as zinc, lead, antimony, etc.); and a visit to various plants for observation of numerous common potential health hazards as well as health and safety programs.

MINOR: 8. *Garbage Disposal.*—System of collection in use at hospitals, homes and in the business section; transportation facilities; disposal by dumping, burying, burning, hog farms.

9. *Fly and Insect Control.*—Habits, breeding places; trapping; sprays; fumigation; screening.

10. *Swimming Pool Sanitation.*—Important and approved features of design and construction; method of changing water; chlorination; potential cross connections.

11. *Milk Sanitation.*—Requirements of an approved dairy and milk plant; pasteurization; grading; laboratory control.

12. *Oyster Sheds and Fish Houses.*—Handling of sea foods in boats and at receiving stations; grading, packing, freezing and glazing of shrimp; gross signs of spoilage of fish, shrimp, and/or oysters.

13. *Packing Plant Sanitation.*—Antemortem and postmortem inspection; handling of meats from packer to consumer; sanitary facilities.

14. *Local Water Supply with Emphasis upon Storm Emergencies.*—Source, distribution system, chlorination, potential sources of contamination, standards.

15. *Camp Sanitation.*—Organization of sanitary program in a military camp with inspection of all phases of this program and emphasis upon the part played by the medical personnel.

3RD SEGMENT: After the supervised field trips are completed the class is again reassembled at scheduled hours during which the various groups each re-

port their project. One member of each group is selected at the last minute by a "game of chance" to act as leader,—the entire group appearing before the class as a "Round table group." The report incorporates and integrates what was seen with what could be learned through other sources, and an attempt is made to give the class a fairly complete picture of each topic, bearing in mind that 90 per cent of the students want facts useful in the general practice of medicine. It is our experience that the students feel honored and strive hard to outdo each other in rendering a complete and comprehensive,—as well as practical,—report. All students are given the opportunity to ask questions.

4TH SEGMENT: This consists of a written report of an inspection or study of a public health problem selected from 30 or 40 problems suggested. The necessary contacts are made so that the student may have access to such places or such material as he feels necessary to adequately conduct his study. This wide selection is thought to be a very workable method of ascertaining and encouraging student interest and also of obtaining material which can be used for incorporation into a departmental "master" report covering the general sanitation of the municipality.

By this rather varied and flexible plan we have been able to create more interest, enthusiasm and desire for work than we had hoped. The students are convinced that preventive medicine as presented is a "live" and an important part of a well balanced medical education. It is felt that the plan operates effectively in providing the best possible practical experience in preventive medicine and public health in so far as the future obligations of a general practitioner are concerned.

Visual Education in Medicine

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The creation, organization and maintenance of a department of visual education involves a number of coordinated efforts. The main purpose is to disseminate through visual means information relative to the study, prevention and treatment of disease. This is done by the application of art, photography and the science of display to these subjects, emphasizing the clearness and accuracy of the picture and the most favorable method of presentation. To this presentation of information, conveyed through visual perception, we apply the term "Visual Education." It is no longer possible to hold the attention of even the public, much less students of medicine and physicians, with didactic verbiage and vacuous dissertations. But by the use of drawings, motion pictures, illustrated lectures and exhibits, combined with an authoritative text, the facts of medicine can be presented admirably in a more readily absorbed form through sight, from which the majority of all knowledge is gained.

Visual education has grown in proportion to the increasing desire to present a thorough knowledge of medical subjects in the shortest possible time; also in proportion to our ability to produce better and more correlated material. It has been especially useful in the present accelerated program of study due to war conditions. It is not intended to supplant the necessary laboratory or clinical procedures in teaching but to clarify and make them more understandable. It gives the student the most valuable and condensed information in a readily absorbed form without any loss of time. This is especially necessary when even the basic principles of medicine have grown to encompass so much knowledge that the best students find it almost impossible to acquire the vast amount of essential information in the time allotted unless every possible facility for presentation is used to make every academic minute count.

The department produces and catalogues the visual teaching material for the medical school and extension programs. It maintains a cooperative relationship in visual educational activities with all other departments of the school. When their teaching programs can be better presented by the use of drawings, charts, diagrams, photographs or lantern slides, these are produced in the department. Motion pictures on all subjects are photographed, edited and titled. Every effort is made to produce films on subjects that have local teaching value. Where this is not possible, films are purchased from the most expedient source. It is very important that all films be owned by the institution, if possible. The value of owning films is that they may be used in each course at the moment when the film subject coincides with the same subject in lecture or laboratory. Exhibits are often kept permanently mounted, especially those desired for their

current instruction value; otherwise, they are dismantled and stored for use when needed. There should be enough space provided in a well planned visual education department for exhibits to be kept set up permanently, not only for their immediate teaching value but as a progressive display of medical thought.

An integral part of the department is an auditorium that is designed so that it can be darkened completely at any time. This is quite necessary for film previews and other projections to demonstrate the conditions required for the most effective use of visual material. Hours of painstaking work can be invalidated by improper conditions for projection such as a half-darkened auditorium or faulty apparatus.

The head of the department supervises and coordinates the activities of the personnel engaged in the production of visual material. He evaluates the relative effectiveness of all material available, making use of the best in developing and directing a comprehensive program of medical visual information. It is his responsibility to keep informed as to the use of equipment necessary in his department and to be able to select that which is best adapted to medical subjects. He must also be capable of judging the usefulness of new display and projection apparatus.

There should always be an inquiring and investigative mind connected with the work of a visual education department, so that newer techniques may constantly be developed for better display and presentation. Such work is carried on here. I have developed a process for making photographic prints in color particularly adapted to medical subjects. Another development has been a completely coordinated lighting unit for shadowless motion picture photography of surgical subjects. For a number of years we have had in process of development a coaxial beam lighting unit for endoscopic instruments which will be used, when perfected, for making motion pictures, especially through the gastroscope.

Many institutions have work similar to ours performed by several departments but such an arrangement is lacking in greatest effectiveness and economy, in our opinion. Our earnest desire, in combining all visual production efforts in this one department, is to see visual material more fully utilized and to find new ways for its use. One handicap to the establishment of more departments of this kind seems to be the scarcity of sufficiently trained personnel. This scarcity, however, does not arise as much from the lack of talented persons as from the lack of sponsored education for those having the desire to learn. The training of selected students was one of the primary factors in the establishing of our present department. For if this work is to progress, a sufficient number of persons must be trained to carry it on efficiently with credit to themselves and their schools.

We maintain a complete illustration service for the teaching personnel, who may secure material for reproduction in medical publications and for presentation before medical societies and other scientific assemblies. This includes drawings, photomicrographs, retinal pictures, lantern slides, and motion pictures, both in color and monotone.

The designing and building of exhibits is an important function of the department. When we build an exhibit, we endeavor to present the facts of a medical subject or research problem, in collaboration with the research worker, using all means of display advantageous to its presentation in the most convincing manner. Exhibits, as usually prepared by the medical or scientific man, are lacking in display technique. This is probably caused by his life long training in which he has inculcated the desire to avoid display and publicity and to his wish to give nothing but facts. We do not wish to disparage this attitude but merely to call his attention to the fact that by the proper application of display technique and controlled showmanship, his observations may be more clearly, pleasantly and quickly understood. The combining of essential facts in an attractive display is not only important to students and the medical profession but is most necessary for the laity.

The time seems to have passed when the collected knowledge of medicine was cloistered in a few museums of the country, there to be visited by only those interested persons who had sufficient time and money for travel and study. The museums served their purpose admirably as collecting points and storehouses of medical knowledge. But today they are making a fine effort to redistribute this knowledge through visual means to all parts of the country. It is therefore the privilege of visual education departments to make use of this material, combining and correlating it with their own local material. This contributes toward a broader national knowledge of medicine.

My work in visual education in the Southwest has been in progress for many years and, it is believed, has served a useful place not only in school teaching but also in the presentation of medical programs by films, exhibits and illustrated lectures to county medical societies and other assemblies. The deep appreciation of the men so contacted has made this a decidedly worth while extension program. The department has produced, in collaboration with many teachers, research workers and members of the medical profession, a great number of medical and scientific exhibits which have combined all known means of art display and design without any encroachment on the medical facts presented.

There has been a retarding opinion regarding the combining of art and photography in their application to medical subjects,—a belief that they could not or should not be combined. This has prevented the establishment of many effective departments. We believe, after many years of observation, that drawing, photography and all other means of display should be incorporated in one department. Each has its place and, at times, one may advantageously supplement the other, if the limitations of each are recognized.

Photography has many uses in reproduction, since most drawings, graphs and charts must be reproduced for publication or illustrated lectures. Photomicrography is certainly a more practical procedure than the tedious drawing of a microscopic field. On the other hand, a carefully executed drawing may incorporate many factual details based upon information, that could never be

photographed. Illustrations for books on projected or actual surgical procedures would certainly suffer if it were not for medical artists, who have an untold devotion for art and medicine.

In teaching, visual aids are best used on problems where hours of personal demonstration are ordinarily necessary for the proper understanding of a subject. These demonstrations, while possible, serve only small groups but through pictorial recording and duplication, large classes may be equally well taught. In indoctrination programs, a synopsis of each departmental subject may be presented in a few hours' time, enabling the student to understand what is expected of him in carefulness and accuracy throughout the course. Here motion pictures seem to be the method best suited, for one sixteen-hundred-foot reel of film may incorporate in sight, sound, motion and color an interpretation of medical facts which is invaluable not only in teaching students but in post-graduate training as well. Films also act as a liaison between the medical profession and the public by the presentation of information on the prevention and control of disease. When properly used, they are a powerful force in improving the health of the community and in bringing about a much better understanding of the medical viewpoint.

Visual recordings in research are as necessary as the research itself and may be used by the worker to check and elaborate on his progressive findings. These records are valuable to him, his coworkers and to students and may be added to a national and international pool of research endeavors.

Teaching through visual means is sound and effective. There is ample proof of its effectiveness in the training of the armed forces and defense workers through motion pictures. Never before have so many been trained so quickly in doing things by seeing well-applied technique illustrated.

There is not a subject of medical education that does not lend itself well to visual teaching, world wide in its scope, effective in any language. It transcends all bounds, a common ground where all can understand.

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Postwar Medical Education

At a meeting of the Executive Council of the Association of American Medical Colleges the following resolutions were adopted:

Resolved, that the Executive Council of the Association of American Medical Colleges recommends that each member of the Association endeavor to formulate a program for postwar graduate and postgraduate medical education in affiliation with the hospitals in its area which can provide satisfactory advanced clinical training.

Resolved, that the Association initiate and participate in the creation of a Committee on Postwar Medical Education to study the adjustments in medical education which may be necessary after the war and to make general recommendations regarding these questions, with special reference to the educational needs of medical officers when they are discharged from the services.

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The Two Year Medical Schools

The trends in medical education are responsible for the passing of the two year medical schools or schools of basic medical sciences as they have been termed for several years. These schools, at one time, served a very useful function and had an important place in the program of medical education. States which did not have the facilities needed for the conduct of a full school of medicine were once encouraged to establish good two year schools. At that time, the program of medical education was sharply divided into four separate years, making it possible to offer the first and second years and do a good job. Today this program has become an integrated and correlated one, which has done away with the separation of the years. Each year is correlated with every other year, making a composite whole of the four year program. Therefore, the two year schools are finding it increasingly difficult to keep pace with the trends.

Up to 1941, there were ten two year schools. In 1941, Wake Forest College brought into existence the Bowman Gray School of Medicine, this being an extension of its former two year school to the full four years. In 1943, Alabama voted to establish a four year school which, as decided at present, will be located in Birmingham where satisfactory clinical facilities are available. Missouri planned a four year school, brought the problem to the attention of the state legislature but approval of the plan was not given. It is reported that the matter will be presented to the legislature again at its next session. The plan included giving the clinical years, for the time being, in Kansas City where adequate clinical facilities are available. Later, after the war, the whole school was to be moved to Kansas City.

West Virginia University made a contractual tie-up with the Medical College of Virginia which provided that West Virginia students will take the third and fourth years of the course in Richmond and graduate as West Virginia students. It is reported that North Carolina is in process of planning a four year school in Chapel Hill where adequate hospital facilities are to be provided by the erection of a teaching hospital. Mississippi has also planned to go to four years. The problem was to have been presented to the legislature at its present session. A report on what resulted has not been received. However, it was stated that every one concerned favored the step. It is probable that the

four year school will be located in Jackson which has some fine clinical facilities which it is planned will be increased considerably by the state.

Rumors are current that the two Dakotas, North and South, are thinking about going to four years. It is likely that adequate clinical facilities are available in one or more of the larger cities in each state which would demand that the present location at the seat of the state university be abandoned. If the student body be kept at its present size, it is possible that both North and South Dakota can operate a satisfactory school of medicine in whatever city offers adequate clinical facilities.

So far as present information goes, Dartmouth does not contemplate making a change at this time or even in the near future. There is an excellent hospital in Hanover, staffed by well trained men in the various fields of medicine, which probably can provide the needed clinical teaching for a small school such as Dartmouth has been for many years. Dartmouth may have larger plans in mind. Another good medical school in the New England area would fill a great need, especially because there is not a medical school in Maine.

It would seem, then, that the passing of the two year medical school is no longer a vision, something to talk about, but a fact. Another important item contributing to this passing is the fact that the four year schools are finding it increasingly difficult to accept more students in the third year class than enter normally from their own sophomore class. Facilities have been strained to the utmost by the acceptance of a greater number of freshmen than before the war. Thus, the number who enter the third year is just about the number that can be accommodated for clinical instruction.

The two year schools have done a good job. Their students have made a good record in the four year schools, but time brings many changes. The change in the trend of medical education and instruction must be recognized and call for a revision of former procedures no matter how useful a purpose they served.

Tropical Medicine Fellowships

The John and Mary R. Markle Foundation has made it possible for men who have a real interest in tropical diseases to spend one month in Central America in actual contact with these diseases. Elsewhere in this issue of the JOURNAL appears the report of the Committee on the Teaching of Tropical Medicine of which Dr. Henry E. Meleney, Herman Biggs Professor of Public Health and Preventive Medicine, New York University College of Medicine, is chairman.

This is the most noteworthy contribution to medical education that has ever been made. Many contributions have been made to support projects in course of development, or proposed, here at home. Many contributions have been to the building programs of medical schools but the Markle contribution is the first aid to a purely teaching program. Many men have had the opportunity to spend two months at the Army Medical School studying tropical diseases. Some have gone to Tulane. Many men in both groups have had the opportunity to round out their experience by going to Central America for one month studying tropical diseases in their native environment. This has been a wonderful experience.

From June, 1943, to May, 1944, inclusive, 77 men, representing 49 medical colleges in the United States and Canada, will have spent one month in Central America. Participants have reported on their experiences. Some have made suggestions as to how this experience can be made more valuable. Twenty colleges will have sent two members of their faculty when the group for May has left. Three schools have sent three men each. Tropical diseases surely will be an important and common clinical entity from now on. Many members of the armed forces will be infested with these diseases and will, no doubt, be foci of spread. Hence, the importance and value of this program of instruction cannot be overestimated. In all parts of the country there will be men who are prepared to meet the challenge. Those who participated in the program will have imparted

what they have learned to many thousands of medical students who, in turn, will be well prepared to combat these diseases. To the John and Mary R. Markle Foundation, and its far sighted vice president, Mr. Archie S. Woods, our most sincere thanks for this fine contribution to the welfare of mankind.

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Internships and Residencies

The Hospital Number of the *Journal of the American Medical Association,* March 25, 1944, presents statistics on internships and residencies. It is an important and valuable study.

On January 1, 1944, when the 9-9-9 program of the Procurement and Assignment Service was inaugurated, 715 civilian hospitals were approved for internships and 659 for residencies. The total number of approved hospitals, however, was 1,054, since 320 hospitals were accredited in both classifications. These approved hospitals had 5,170 interns, 1,452 assistant residents and 2,064 residents. These figures are lower than those reported January 1, 1943, when there were 5,567 interns, 1,210 assistant residents, 2,633 residents and 609 fellows.

Most hospitals are offering a rotating type of service, namely, 673, or 94 per cent; 23, or 3 per cent are mixed and 19, or 2 per cent are straight. Ten hospitals have combined services. Of the 5,170 interns, 4,551, or 88 per cent of the total number, are on a rotating service; 152, or 3 per cent, are in the mixed group; 467, or 9 per cent, have straight assignments.

The data on necropsy service are extremely interesting. Only 21 hospitals have more than 70 per cent necropsies. The University of Michigan Hospital leads with 97 per cent. Four hospitals report between 80 and 90 per cent; 11 between 70 and 80 per cent; 5 report a flat 70 per cent. One hundred hospitals reported having less than 15 per cent necropsies out of a total of 704 hospitals reporting; 291 reported from 15 to 29 per cent; 222 between 30 and 49 per cent; 70 between 50 and 69 per cent. The intern and residency hospitals, as a group, reported 30.67 per cent necropsies.

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Internships

Again, the problem of setting up a uniform procedure for the selection of interns is with us. Several years ago, the Association of American Medical Colleges appointed a committee whose function it was to try to have accepted by the hospitals a set date on which announcement of intern appointments would be made. One thought was that hospitals would not make any attempt to secure interns until students had completed their junior year. About 85 per cent agreed to cooperate. But they did not cooperate 85 per cent worth. The committee finally gave up after having tried for two or three years to make the plan effective.

Now the Detroit District Hospital Council is bringing up the matter again. The hospitals represented in this Council are concerned about the manner in which some hospitals secure interns. They object, particularly, that even sophomore medical students are signed up for an internship. They believe that a student should not be approached until he has completed his junior year which was also the belief of the committee of this Association. Then he would have completed one clinical year. It is very desirous that hospitals consider this matter seriously and reach an agreement as to when they will make contacts with medical students for internships. Perhaps, some hospitals have too many interns. Perhaps, some hospitals will do well to go on the house officer plan. Some hospitals are doing that with excellent results. This vexatious problem must be solved and the sooner the better.

College News

University of Texas
School of Medicine

Frank M. Stead, Ph.D., associate professor of sanitation, has resigned. Dr. Joe B. Winton has been appointed to succeed him. Dr. J. Allen Scott, senior statistician in the division of vital statistics of the U. S. Bureau of Census and formerly with the Rockefeller Foundation in Egypt, has been associate professor of preventive medicine in the special field of statistics and epidemiology.

Doctor Sumner L. Koch, Department of Surgery, Northwestern University Medical School, gave an illustrated address March 15, on "The Surgical Management of Burns."

The establishment of an annual lectureship is announced under the auspices of the Phi Beta Pi Medical Fraternity. The first lecture in the series was given by Theophilus S. Painter, Ph.D., Professor of Zoology at the University of Texas, March 25. Professor Painter's lecture was entitled "A Cytologist Looks Forward."

A grant of $2,400 has been received from Frederick Stearns & Company of Detroit, Michigan, for the support of a fellowship in pharmacology; also a grant of $2,400 from the Bilhuber-Knoll Company of Orange, New Jersey, for the support of a fellowship in pharmacology.

Charles M. Pomerat, Ph.D., Professor of Anatomy, was the speaker at the annual banquet and meeting of the Celsus Society of San Antonio March 5th. Doctor Pomerat spoke on "Medical Influences in the English Medieval Renaissance."

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New York Medical College

The New York Medical College has recently been the beneficiary of two gifts from Mrs. John Eastman Wilson in memory of her late husband. Dr. Wilson was professor of neurology and was associated with the College from 1902 to 1918. One gift of $100,000 has been designated as a loan fund for needy medical students. The other gift of $10,000 has been added to the endowment of the department of surgery. A grant of $30,000 was received from the Anaconda Wire and Cable Company for research projects in industrial medicine, arising out of problems incident to the manufacture of the Company's products. The study will determine whether occupational hazards exist and will develop means of giving adequate protection to the workers, if necessary. The project is under the direction of Dr. Lindsley F. Cocheu, Director of the Department of Public Health and Industrial Medicine, assisted by Dr. Linn J. Boyd, Director of the Department of Medicine, and Dr. Francis J. Speer, Director of the Clinical Pathology Laboratories. A teaching affiliation has been established between the City Hospital of the Department of Hospitals, New York City, and the New York Medical College. According to this arrangement, extensive clinical facilities in medicine, surgery, obstetrics, gynecology, neurology and pathology will now be available to students of the Medical College. The Hospital is located on Welfare Island, adjacent to the Metropolitan Hospital, which is also used for teaching purposes by the College. City Hospital also maintains jointly with the Metropolitan Hospital an extensive Outpatient Department.

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Columbia University College of
Physicians and Surgeons

New Appointments: Samuel Gelfan, Ph.D., assistant professor of physiology; Dr. Wendell L. Hughes, associate clinical professor of ophthalmology; Dr. Willis S. Knighton, associate clinical professor of ophthalmology; Dr. Edgar M. Medlar, associate professor of pathology; Dr. Maxwell D. Ryan, associate clinical professor of otolaryngology.

University of Alabama
School of Medicine

It has been decided to locate the four year medical school authorized by the legislature of the State of Alabama in Birmingham. A science building will be erected adjacent to the Hillman Hospital which will be the main supply for the clinical teaching. Satisfactory arrangements for control of teaching have been made with the County which owns the hospital. The adjoining Jefferson Hospital will also supply facilities for clinical instruction. A special commission appointed by the governor of the State, of which Dr. Wm. D. Partlow, Tuscaloosa, is chairman, has had this matter under advisement since last Fall. The result of the careful and thorough survey and study made by this commission is the decision to locate the medical school in Birmingham. The state has already appropriated one million dollars to erect the medical school building.

Dr. Stuart Graves, dean for many years, having neared the retirement age, requested the University authorities to release him from the arduous task of organizing a four year medical school. He will continue in his present capacity during the period of transition to a four year school. Acting on Dr. Graves suggestion that a younger man should be secured to take full charge of the development of the four year school, the University authorities have chosen for the deanship Dr. Roy R. Kracke, professor of pathology in Emory University School of Medicine. Dr. Kracke is a native of Alabama; was a student at Alabama Polytechnic Institute, took his first two years in medicine at the University of Alabama and graduated from the University of Chicago, M.D., in 1927. Dr. Kracke is well known in medical education circles, as a pathologist and scientist. He has received recognition by all groups.

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Dartmouth Medical School

Dr. Colin C. Stewart, Brown professor of physiology, died January 27th, aged 70. He had been a member of the faculty since 1904.

Southwestern Medical College

Dr. Tinsley Harrison, formerly professor of medicine in the Bowman Gray School of Medicine, has accepted the deanship at Southwestern. He will also function as executive professor of experimental medicine and professor of internal medicine and head of the department. Dr. Donald Slaughter, who has been acting dean since the school was organized, becomes dean of students. The first graduation exercises of the college were held March 20th.

New Appointments: Simon E. Sulkin, Ph.D., associate professor of bacteriology; Robert M. Pike, Ph.D., assistant professor of bacteriology.

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Bowman Gray School of Medicine

Following the resignation of Dr. Tinsley Harrison as professor of medicine and head of the department, Dr. George F. Harrell has been promoted to director of the department. Dr. Frederick R. Taylor has been promoted to a newly created position of professor of medical literature and Dr. J. C. Pass Fearrington has been named associate professor of clinical medicine. Dr. Taylor's appointment is the first of the kind in a medical school. He was for many years on the editorial staff of Oxford Medicine.

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Jefferson Medical College

Dr. Randle C. Rosenberger, a member of the faculty since 1894, professor of bacteriology since 1909, a member of that department since 1898, died March 4 of acute myeloblastic leukemia. Dr. Rosenberger was well known as an able teacher and bacteriologist. He hald many important positions in other hospitals. In addition to his great interest in teaching medical students he devoted considerable time to the study of tuberculosis. He was the last of the "Old Guard" at Jefferson.

Dr. Hobert A. Reimann, professor of medicine, visited Puerto Rico in December as guest of the Puerto Rican Medical Association in San Juan, where he gave several lectures on acute infectious diseases.

University of Oregon
Medical School

Dean David W. E. Baird announced the purchase of the Portland Medical Hospital building on Marquam Hill. The building will be converted into a dormitory for student nurses after March 1.

Dr. John Lockwood of the University of Pennsylvania conferred with members of the Medical School staff, January 21, while making a survey of medical school postwar plans.

Dr. Jean Curran, Dean of the Long Island College of Medicine, visited Dean Baird while making a transcontinental study of the aspects of industrial medicine.

First hand study of tropical diseases will be made by Dr. Matthew C. Riddle and Dr. Harry J. Sears as an aid to wartime medical instruction. Dr. Riddle, associate professor in clinical medicine, flew direct to Central America. Dr. Sears, head of the Bacteriological Department, will spend two months in the Army Medical School in Washington, D. C., before making a tour of hospitals and clinics in Costa Rica, Honduras and Guatemala.

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Baylor University
College of Medicine

The Fulbright professorship of pathology has been endowed at Baylor University College of Medicine, Houston, under a contract executed between Mrs. Irene Fulbright, widow of R. C. Fulbright of Houston and Washington, and the Houston executive committee of the board of trustees of Baylor University. Under the agreement Mrs. Fulbright will make an annual cash contribution toward the expense of the professorship and has agreed to make the endowment permanent by naming Baylor University College of Medicine as the legatee of her estate on her death. Both Mr. and Mrs. Fulbright were students at Baylor. Mr. Fulbright during his life created a trust estate to become the property of the college of medicine after certain stipulations had been fulfilled. In the recent agreement it was provided that the trust fund by Mr. Fulbright will be used jointly with the funds to the college from Mrs. Fulbright to take care of the expense of the professorship. It is also provided that if the income from the funds amounts to more than the cost of the professorship the excess will go to the department of pathology to be used for maintenance, equipment and supplies.

Dr. Stuart A. Wallace, chairman of the department of pathology, is the first incumbent of the newly created Fulbright professorship of pathology.

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Syracuse University
College of Medicine

The Edward C. Reifenstein Professorship of Medicine is to be established at Syracuse University College of Medicine, under the will of the late Horace White, formerly governor of New York State. The professorship will honor E. C. Reifenstein who was Governor White's personal physician, and who has served as Professor of Medicine in the College of Medicine from 1932. Governor White's will provides that one-quarter of his residuary estate, which is estimated will total more than one million dollars, be given to Syracuse University to create "The Horace White Fund." The income from this fund will be used first, to pay the salary of the professor of medicine; second, in case there should be any surplus income after payment of such salary, such surplus will be used to restore the principal of the fund to its original amount and for the care and treatment of hospital ward patients.

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University of California
Medical School

Dr. Hamilton H. Anderson has been appointed professor of pharmacology, succeeding Dr. Chauncey D. Leake, who is now dean of the School of Medicine of the University of Texas. Dr. Anderson recently returned from China. He was professor of pharmacology in Peiping Union Medical College.

Woman's Medical College

The Woman's Medical College of Pennsylvania held its ninety-second annual commencement on March 16th at the College of Physicians of Philadelphia. Degrees were conferred on twenty-one graduates by the Honorable Herbert F. Goodrich, LL.B., LL.D., Chairman of the Board of Corporators and Acting President of the Woman's Medical College. Of the twenty-seven living members of the Class of 1894, seven were present to receive the Fifty-year Medal awarded by the Alumnae Association to the members of the Class. Dr. Harold Dean Palmer, Professor of Psychiatry at the College, made the commencement address.

At the luncheon which followed the Commencement Exercises Dr. Josephine C. Lawney, Dean of the Women's Christian Medical College in Shanghai, spoke on "Medical Women in China;" and Major Margaret D. Craighill, of the Office of the Surgeon General, United States Army, reviewed the present day opportunities and obligations of women physicians. Miss I. A. R. Wylie, well known author, spoke on the place of women in the postwar world.

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University of Buffalo
School of Medicine

Establishment of a research department at the Children's Hospital and a research professorship of pediatrics at the University of Buffalo was completed with the arrival of Dr. Edward M. Bridge as the joint appointee of the two institutions. Dr. Bridge comes from Johns Hopkins University, with which he has been associated for 16 years. The hospital research department, made possible by a grant of the trustees of the estate of the late E. M. Statler, is only the fifth or sixth in the country. The hospital is remodeling a whole floor of one of its buildings to house the laboratories.

Dr. Bridge will do research on drugs used in the treatment of epilepsy, the water and sugar requirements of sick children, the care of premature infants and other pediatric problems. At the medical school he will teach pediatrics and stimulate interest in research among medical students.

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University of North Carolina
School of Medicine

The governor of North Carolina has recommended that the present two year medical school be enlarged and increased to provide for a full four year medical course, that an adequate hospital be erected at the medical school with a capacity of not less than 600 and preferably 1,000 beds, that the hospital shall be open to patients from all sections of the state with provision for free medical and hospital service to all patients unable to pay for the service and that other hospitals to serve as local medical centers be established in strategic regions of the state.

Fred W. Ellis, Ph.D., associate in pharmacology in Jefferson Medical College, has been appointed assistant professor of pharmacology.

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Stanford University
School of Medicine

The sixty-second course of popular medical lectures will be given at Lane Hall March 17 and 31, April 14 and 28, 1944. The subjects of these lectures and the speakers are: Treatment of Infantile Paralysis, Dr. Wm. H. Northway; Caudal Anesthesia in Obstetrics, Dr. Albert V. Pettit; Nutrition: One Factor in the Health Program, Dr. Nina Simmons; Psychological Types and Marriage, Dr. Horace Gray. Dr. F. P. Luduena has been appointed adjunct professor of pharmacology.

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Louisiana State University
School of Medicine

The Library of the School of Medicine of Louisiana State University has received a special appropriation of $36,000 from the Board of Supervisors of the University for the expansion of the library. These funds will be used in purchasing sets of Journals needed by the library.

University of Pittsburgh
School of Medicine

The James S. Kemper Foundation has granted $2,500 to the Department of Industrial Hygiene for the purpose of establishing a fellowship in Industrial Medicine. The purpose of the fellowship is to make available to a well qualified physician the opportunity to pursue graduate work in preparation for a career in the field of Industrial Medicine. Details of the fellowship will be made available to interested candidates on communication with the Dean of the School of Medicine, University of Pittsburgh.

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Tulane University of Louisiana
School of Medicine

The next freshman class will be admitted December 1, 1944, instead of November 1 as announced previously.

Dr. Cecil A. Krakower, formerly connected with the Columbia University School of Tropical Medicine in San Juan, P. R., has been appointed assistant professor of bacteriology and pathology. Dr. Arthur Judson Walker, formerly acting medical director of the Firestone Plantations Company in Liberia, has been named assistant professor of tropical medicine.

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Vanderbilt University
School of Medicine

The degree of master of public health was conferred on Dr. Fridgeir Olason and Dr. Fritz Plotke at the graduation exercises recently, marking the first time in the history of the university that such a degree has been granted. Dr. Olason came to Vanderbilt in 1942 from Reykjavik, Iceland, and in the same year Dr. Plotke came from the state hospital in Manteno, Ill.

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Creighton University
School of Medicine

Dr. Richard L. Egan has been assigned to a full time position in the department of medicine.

Duke University
School of Medicine

Joseph E. Markee, Ph.D., professor of anatomy, Stanford University School of Medicine, San Francisco, has been made professor and head of the department of anatomy. Dr. Markee received his doctor of philosophy degree at the University of Chicago in 1929 and has been associated with Stanford since that time.

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Yale University Medical School

George R. Cowgill, Ph.D., associate professor of physiologic chemistry, is the first incumbent of a newly created professorship in nutrition at Yale. Dr. Cowgill was a pupil of the late Lafayette B. Mendel, Sc.D., and has been a member of the department of physiologic chemistry since 1921.

◆ ◆

University of Southern California
School of Medicine

Dr. John D. Lyttle, assistant clinical professor of pediatrics, Columbia University, has been appointed professor of pediatrics and director of pediatrics in the Children's Hospital.

◆ ◆

Hahnemann Medical College

Dr. William A. Pearson has resigned as dean, a position he held since 1913. Dr. Pearson will continue as professor and head of the department of chemistry. William G. Schmidt, Ph.D., has been named acting dean.

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University of Minnesota
Medical School

Dr. Erling W. Hansen has been appointed clinical professor and director of the division of ophthalmology.

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University of Utah
School of Medicine

Dr. Orin A. Ogilvie, professor and head of the department of pathology, has resigned.

University of Virginia
Department of Medicine

A Charles Scott Venable Annual Lectureship in Traumatic Surgery has been established. This lectureship is supported by royalties from the sale of an adjustable splint designed by Dr. Charles Scott Venable, Jr. The splint has been made available without royalties or encumbrances to the Red Cross and civilian defense agencies and is now in general use both in the United States and Canada. It is standard equipment for the Canadian National Railway. It is also obligatory equipment for all ambulances in the state of Texas. Dr. Venable was graduated from the Medical School of the University of Virginia in June, 1900. He is chief of staff of the Nix Hospital, San Antonio, Texas.

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University of Kansas
School of Medicine

A fund is being collected to establish the Francisco Memorial Foundation in honor of Dr. Clarence B. Francisco, Kansas City, Mo., professor of clinical surgery at the university, who died on February 23. The fund was started by medical students and faculty members, and it is hoped to accumulate sufficient funds to erect a student union building on the medical school campus in Kansas City. The building would house the medical library, a cafeteria, a recreation center, postgraduate facilities, a dormitory and rooms for visiting physicians. Dr. Francisco, who graduated at the University of Kansas School of Medicine in 1907, became associated with it in 1910.

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University of Louisville
School of Medicine

Students are examining domestic employees in a program for the examination of workers conducted by the medical school and partly financed by the Louisville Tuberculosis Association. Blood pressure and blood samples for the Kahn test are taken and the Snellen vision test made. An examination of the eye, ear, nose and throat and dental examination, urinalysis, cervical smears and blood analyses are included in the work done by the students. Chest fluoroscopy is made under the supervision of a physician in charge of the clinic, and the results are recorded on the patient's history blank. On completion of the work, physicians in charge of the clinic go over the results.

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Northwestern University
Medical School

Promotions: Dr. Henry R. Jacobs, to assistant professor of medicine; Dr. Irving Puntenney, to assistant professor of ophthalmology; Dr. Frederick R. Schmidt, to assistant professor of dermatology.

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University of Vermont
College of Medicine

A grant of $1,500 has been made to Dr. Louis S. Goodman, professor of pharmacology and physiology, by the Abbott Laboratories, North Chicago, Ill., for the study of synthetic anticonvulsants and analgesics.

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University of Oklahoma
School of Medicine

Arthur A. Hellbaum, Ph.D., associate professor of physiology, has been appointed professor and acting chairman of the department. Dr. John W. Cavanaugh, assistant professor of surgery, has been appointed a full time professor.

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New York University
College of Medicine

Dr. James A. Shannon succeeded Dr. Geo. B. Wallace as professor of pharmacology and chairman of the department on the latter's retirement in March.

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University of Southern California
School of Medicine

Dr. John D. Lyttle, since 1921 a member of the faculty of Columbia University College of Physicians and Surgeons, has been appointed professor of pediatrics and director of pediatrics of the Children's Hospital.

Book News

Human Constitution in Clinical Medicine

By George Draper, M.D., Associate Professor of Clinical Medicine, Columbia University, C. W. Dupertuis, Ph.D., Physical Anthropologist, Presbyterian Hospital, and J. L. Caughey, M.D., Associate in Medicine, Columbia University. Paul B. Hoeber, Inc., Medical Department of Harper & Brothers, New York. 1944. Price, $4.

The purpose of this book is to present evidence that there is an essential relationship between each individual person and the disease from which he or she may suffer. And the authors have done a good job. The book is not large; medical students will find it profitable to read the book carefully. It will be most helpful to them in their clinical work. Heretofore not sufficient attention has been paid to this important phase of medicine. Students have always said that the disease met with in practice never is like the description in the textbook. That is true. The disease is peculiar to the one who has it, hence its manifestations differ with the constitution of the individual. It is essential to remember that. This book will go far to give the student the right concept of what the disease may look like in the particular individual.

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The Permeability of Natural Membranes

By Hugh Davison, D.Sc., Associate Professor of Physiology, Dalhousie University, and James F. Danielli, D.Sc., Beit Memorial Research Fellow and Fellow of St. John's College, Cambridge, England. With a Foreword by E. Newton Harvey, Professor of Physiology, Princeton University. The Macmillan Company, New York. 1943. Price, $4.75.

Cell permeability is discussed well in all its phases. A book for chemists rather than medical students for whom it is rather technical—although important.

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A Textbook of Pathology

Edited by E. T. Bell, M.D., Professor of Pathology in the University of Minnesota. Ed. 5. Lea & Febiger, Philadelphia. 1944. Price, $9.50.

A large amount of new material has been added. The discussion of several topics has been expanded, such as shock, vitamin deficiencies, blast injuries, Boeck's sarcoma and several infectious diseases of interest in war medicine. Although this is a cooperative work, the text is uniform in its point of view.

Synopsis of Materia Medica, Toxicology and Pharmacology

By Forrest R. Davison, Ph.D., M.B., formerly Assistant Professor of Pharmacology, University of Arkansas School of Medicine. Ed. 3. The C. V. Mosby Company, St. Louis. 1943. Price, $6.50.

"A multum in parvo" for the medical student. He will get much out of this book with comparatively little reading and without spending much time looking for something he wants to know. It is somewhat lengthy, but, presumably the author is convinced that he must present all he has to be complete.

◆ ◆

Atlas of Anatomy

By J. C. Boileau Grant, M.B., F.R.C.S. (Edin.), Professor of Anatomy, University of Toronto. Vol. II. Vertebrae and Vertebral Column, Thorax, Head and Neck. The Williams & Wilkins Company, Baltimore. 1943. Price, $5.

The second in this series of fine anatomical presentations. Valuable for the student in his preclinical and clinical years. Everything about a region is shown and considered together. Besides clarity and exactness, every plate is a work of art. Author and artist are to be congratulated on their fine work.

◆ ◆

The Principles and Practice of Medicine (Originally written by Sir William Osler)

By Henry A. Christian, M.D., Hersey Professor of the Theory and Practice of Physic, Emeritus, Harvard University. Ed. 15. D. Appleton-Century Company, New York. 1944. Price, $9.50.

The book has been rewritten and brought up to date in every respect, including all the latest knowledge on drugs, vitamins, essential food factors and the deficiency diseases. The book is too well known to make commendation necessary. It is somewhat of a shock to see Osler's name omitted from the title, although it is quite proper that it be omitted since whatever value the book has now is due entirely to its present author.

◆ ◆

Textbook of Anatomy and Physiology

By Catherine P. Anthony, R.N., Instructor of Anatomy and Physiology, Lutheran Hospital, Cleveland. C. V. Mosby Company, St. Louis. 1944. Price, $3.50.

For nurses. Good.

Medical Physics

Editor in Chief, Otto Glasser, Ph.D., Head Department of Biophysics, Cleveland Clinic Foundation; Professor of Biophysics, Frank E. Bunts Eductional Institute, many associate editors for 23 fields related to medical physics, and several hundred contributors, each an authority in his field. The Yearbook Publishers, Inc., Chicago. 1944. Price, $18.

It is impossible to review this work adequately because it contains probably all that is known about medical physics. It contains about 1,700 pages, parallel columns, with many illustrations and uncountable references to the literature. It gives the impression of completeness.

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Physical Foundations of Radiology

Otto Glaser, Ph.D., Professor of Biophysics, Cleveland Clinic Foundation; Edith H. Quimby, Sc.D., Associate Professor of Radiology, Columbia University; Lauriston S. Taylor, Ph.D., Chief of X-Ray Section, National Bureau of Standards; J. L. Weatherwax, M.A., Philadelphia General Hospital. Paul B. Hoeber, Inc., New York. 1944. Price, $5.

Elementary; nonmathematical; good for use in teaching in medical schools. Physics, especially radiological physics, is stressed.

◆ ◆

Clinical Tropical Medicine
(By Twenty-seven Authors)

Edited by Z. Taylor Bercovitz, M.D., Assistant Clinical Professor, New York Post-Graduate Medical School. With a foreword by Wilbur A. Sawyer, M.D., Director International Health Division, Rockefeller Foundation. Paul B. Hoeber, Inc., New York. 1944. Price, $14.

Many distinguished men in the field of tropical medicine have contributed to this book. Hence, it may be accepted as being authoritative. While not written primarily for medical students, they will find it a good source of information on diseases which will, no doubt, be met far more frequently after the war than before. For the practitioner, it is an excellent work, a veritable mine of valuable information on tropical diseases.

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Manual of the Diseases of the Eye

By Charles H. May, M.D., with the assistance of Charles A. Perera, M.D., Associate in Ophthalmology, Columbia University. Ed. 18. William Wood & Company, Baltimore. 1944. Price, $4.

Few texts can claim to have gone into the 18th edition. This book still holds its own as an excellent student textbook; small size, low cost, full of needed information; well illustrated.

Laboratory Methods of the United States Army

Edited by James Stevens Simmons, M.D., Brigadier General United States Army, Chief of the Preventive Medicine Service, and Cleon J. Gentzkow, M.D., Colonel, Medical Corps, United States Army. Ed. 5. Lea & Febiger, Philadelphia. 1944. Price, $7.50.

The present edition of the Laboratory Methods of the United States Army has been prepared to meet the current war time needs. It offers a valuable reference work to officers and technicians who are called upon to assume responsibility for enormously expanded laboratory services. The book has been revised throughout in order to bring it up to date and many sections have been entirely rewritten. In its present form it is an excellent hand book, not only for the armed services, but for the medical practitioner, bacteriologist, hygienist, sanitarian and veterinarian. It describes practical methods for use in all medical and sanitary laboratories.

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Rorschach's Test:
I. Basic Processes

By Samuel J. Beck, Ph.D., Head of Psychology Laboratory, Department of Neuropsychiatry, Michael Reese Hospital, Chicago; Associate Professor of Psychology, Northwestern University. Foreword by Willard L. Valentine, Ph.D., Head of Department of Psychology, Northwestern University. Grune & Stratton, New York. 1944. Price, $3.50.

A reference book for student and expert. It is technical, exhaustive, detailed. Each basic problem is discussed separately; examples of scoring procedure are given.

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The Art and Science of Nutrition

By Estelle E. Hawley, Ph.D., and Grace Carden, B.S., University of Rochester School of Medicine and Dentistry. Ed. 2. The C. V. Mosby Company, St. Louis. 1944. Price, $3.75.

Completely revised to present present day beliefs on nutrition and the newer knowledge on vitamins. Students will find the outline for diet therapy useful and easily followed. Lists of supplies for the class work have been added to the laboratory outlines.

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Oral Histology and Embryology

Edited by Balint Orban, Chicago College of Dental Surgery, Loyola University. The C. V. Mosby Company, St. Louis. 1944. Price, $6.50.

For dental students. Good book.

Textbook of General Surgery

By Warren H. Cole, M.D., Professor and Head of the Department of Surgery, University of Illinois College of Medicine, and Robert Elman, M.D., Associate Professor of Clinical Surgery, Washington University School of Medicine. Ed. 4. D. Appleton-Century Company, New York. 1944. Price, $10.

Lucid, authoritative, with emphasis placed on sound fundamentals of surgical teaching. A new chapter on war and catastrophe surgery; revision of text on fluid and electrolyte balance; amino-acid therapy; hypoproteinemia; transfusions; chemotherapy; appendicitis; wounds; burns and surgical shock and many other important topics on which the undergraduate must be well informed.

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Synopsis of Diseases of the Heart and Arteries

By George R. Herrmann, M.D., Professor of Medicine, University of Texas. Ed. 3. The C. V. Mosby Company, St. Louis. 1944. Price, $5.

"Condensed text" would have been a better term than "synopsis." It is all there, presented concisely, with many fine illustrations which actually "illustrate," and a simple, logical, sequential arrangement of the material. No need to do a great deal of reading to get the point. The chapter on electrocardiography is to be commended. It helps to get a good understanding of this baffling aid to diagnosis. The author's long experience as a teacher is reflected well in the work. He writes for the student, undergraduate as well as graduate.

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Synopsis of Neuropsychiatry

By Lowell S. Selling, M.D., Director, Psychopathic Clinic, Recorder's Court, Detroit, Michigan. The C. V. Mosby Company, St. Louis. 1944. Price, $5.

To enable the student to get a background of neuropsychiatry, without blocking his memory with detail, to serve as a quick guide for diagnosis and treatment, and to provide a background for intense review, is the objective of this book. There is enough of every phase of the subject to give the student a fairly good understanding what it is all about. At best, psychiatry is a difficult subject for the student. This book will help to make it a little easier for him to grasp fundamental principles.

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Anatomy and Physiology: Laboratory Manual

By Catherine P. Anthony, R.N., Instructor of Anatomy and Physiology, Lutheran Hospital, Cleveland, Ohio.

For nurses.

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Colonel Medical Corps, U. S. Army

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